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ABSTRACT

This conference on program budgeting was planned to accomplish four objectives: (1) provide a basic orientation for academic administrators by defining program budgeting, and explaining how it might help their institutions; (2) interpret the vocabulary of systems analysis; (3) identify the different levels of involvement at which an institution could operate; and (4) appraise the current use of program budgeting in colleges and universities. (Author/MLF)

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AN INTRODUCTION TO PROGRAM PLANNING, BUDGETING AND EVALUATION FOR COLLEGES AND UNIVERSITIES

The Proceedings of a Conference

edited by

Robert J. Parden

Office of Institutional Planning
University of Santa Clara
Santa Clara, California
July 1970

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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INTRODUCTION

During the next ten years, college and university governing boards, administrators, faculty, and students, will devote considerable time to the allocation of limited resources among nearly unlimited needs. They will be seeking ways to stretch these limited funds. They will have the distasteful task of recommending the curtailment of some existing programs. For signs of penury are seen throughout the land. An annual operating deficit approaching two million dollars is recorded for a single institution. Inflation, reduction of federal research funds, the reaction of state legislators to student unrest, the coolness of voters to bond issues, plateaued and even declining enrollments, all contribute to financial stress at the very time when there are pressures to further expand the university's role, particularly in the arena of social action.

In response to these developments, there is a growing interest in those management practices that offer some promise of helping college and universities to alleviate this apparently impossible situation. The term "management" has traditionally been considered the very antithesis of the community of scholars concept. This concept holds that no one person, or group of persons should "manage" anyone in this cooperative endeavor. To accommodate this concern, and at the same time to undertake those functions of management necessary to sustain any viable organization, a new, unique, and hopefully better working arrangement is sought. Program budgeting appears to provide a format which allows for rational decision making consistent with the higher education environment. It provides increased visibility to the allocation process by seeking measures of the benefits realized, for the resources expended.

Program budgeting developed out of an activity currently called systems analysis. This identification alone could be a major handicap to its adoption by higher education because for some relatively limited number of applications, rather sophisticated mathematical analysis is used. The potential of program budgeting could remain hidden behind a facade of technical jargon. Then even the real benefits of more sophisticated analysis will be lost because the procedure has not become part of the day to day operations of the institution. Program budgeting is 80% classical management: long range planning, developing an organization, programs to accomplish goals, control, and evaluation. It is an approach, a mechanism that can lend support to university decision-making by providing additional, pertinent information in a revised format. The assistance will be effective only if there is a genuine communication between the decision makers and the staff who must provide the information. The information must be timely, appropriate, useful, helpful, and above all, contribute to better decisions. If it does not, the cost of developing a management information system will just be a further dilution of already scarce resources. The bridging of the gap between information users--the decision-makers--and information suppliers--data processors and systems analysts--requires an active involvement by both to learn the problems of each, the needs of each, and the potential to be gained if an effective working arrangement can be achieved. This may not be easy considering the contemporary university scene.

Attempts to adapt management procedures to higher education are recent and limited. Only a few colleges and universities were doing institutional research ten years ago. Fewer yet have determined how this knowledge about the institution can be used to improve its performance. The really critical decision points have not been delineated, while information systems are being designed to help resolve the still to be specified problems. The "decision stream" is not identifiable in most institutions because it is so closely atuned to governance. Still we are trying to make an impact on the decision process. Because program budgeting encompasses the entire "system", which is the institution, it is an integral part of the management function. If it achieves its full potential, every facet of the institution will be systematically reviewed and appraised.

The conference recorded in these proceedings was planned to accomplish at least four objectives. The first was to provide a basic orientation for academic administrators--what program budgeting is, and how it might help their institution. The second objective was to interpret the vocabulary of systems analysis, identifying what was new, and that which was old but appearing under a new title. A third objective was to identify the different levels of involvement at which an institution could operate. Large computers and an extensive analytical staff can be used effectively by only a very few institutions. The others must start at a more modest level and become increasingly involved at a rate which will be determined by each institution's ability to adjust to change. The final conference objective was to realistically appraise the current use of program budgeting in colleges and universities. Some administrators feel that they have already been passed by. A reasonable assessment is that most institutions are just getting started.

The conference was scheduled as a session of the Bay Area Academic Forum, an activity initiated cooperatively with the WICHE Department Chairmen Program directed by Dr. David Booth. Mrs. Maureen Fife, Research Analyst and Mrs. Catherine Conrad, Secretary, Office of Institutional Planning, accommodated most of the details of the conference organization and the preparation of these proceedings.

Robert J. Parden
Santa Clara, California
July 15, 1970

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AN INTRODUCTION TO PLANNING, PROGRAMMING, BUDGETING AND EVALUATION FOR COLLEGES AND UNIVERSITIES

by Robert J. Parden, Director
Institutional Planning, and
Dean, School of Engineering,
University of Santa Clara

When Santa Clara's President, Thomas D. Terry, S.J. welcomed you to this conference, he described a current administrative dilemma. "All of us are forced to make decisions with too little information. We have to swing at the pitch when it is thrown. With pressure on all sides to squeeze out more from each collegiate dollar, we need better planning, and better evaluation of what we are doing now." This is an excellent description of what we are seeking to accomplish through program, planning, budgeting and evaluation. We are trying to present additional knowledge of the institution to the decision-makers between the time the pitch is thrown, and the time when it is necessary to swing the bat. We also seek to prevent what has been succinctly expressed by Green and Willets, "The tendency is strong in most universities to expand in more directions than available finances make wise. The resulting poverty is shared by all."[1]

Program budgeting is concerned with this allocation process: considering the resources available to the institution, and its objectives and goals, what combination of activities will best satisfy these goals. Thus it is a procedure, a systematic approach to preventing "the expansion in more directions than available finances make wise."

I PROGRAM BUDGETING - A COMPREHENSIVE APPROACH

WHY PROGRAM BUDGETING There are a number of reasons why colleges and universities have an increased interest in planning, programming, budgeting and evaluation systems--program budgeting.

1. There is an increased competition with other social programs for limited funds. This effects both private and public institutions. We need not look back very far in history to the time when a major portion of many state budgets was directed towards higher education. For example, the building of highway networks began only forty years ago. The social programs of welfare, and medical care for the aged and the indigent are very recent. The concern for the quality of life and for the environment, is growing. Now all of these and other programs require increased funding and are in direct competition with higher education for limited resources. Program budgeting seeks to strengthen the justification for additional funds.

2. Program budgeting has been adopted by the federal government and is now being followed by an increasing number of state agencies. Many colleges and universities will be forced to use this format because it will be required by the agencies to whom they must submit requests.

3. Because funds are less plentiful, there is a growing interest in increased effectiveness. This much maligned term should not be confused with efficiency--which infers just lower costs. Increased effectiveness is the search for the best way to spend resources and to realize the greatest benefits. Contracting dormitory food service to

an outside firm may result in better meals for the same cost. All of us are aware that in recent years higher education has doubled its enrollments while its costs have quadrupled. We are aware that some of this increased cost results from greater demands on higher education. We have grown in areas such as graduate studies which are very expensive. The public, and their representatives, however, would look more favorably on our needs if we explained how and why we spend their money, and what we hope to achieve.

4. The mechanics of governance in colleges and universities are receiving greater attention by all those who wish to increase their participation in directing the future of the institution. Program budgeting may insure that this participation can be accommodated on an orderly basis. This is a format which enhances a more rationale approach to resource allocation by providing greater visibility for the increased number of persons who will participate in every phase of the decision-making process.

5. When there are considerably more projects or programs seeking support than there are funds to support them, institutional priorities must be very carefully established. With a knowledge of what each program seeks to accomplish, and what resources each requires, there is a more rational basis for establishing priorities.

6. The major attractiveness of program budgeting to those who are directly involved in colleges and university administration is the hope that the procedure will provide a handle by which to grasp the essence of increasingly complex institutions. As institutions grow in size it is increasingly difficult to bring into focus the critical

issues on which decisions are based.

CONTEMPORARY FISCAL BUDGETING PROCEDURES

The annual fiscal budget used by most colleges and universities serves primarily as an instrument of authorization and control. Each year, the budget for the next one or two fiscal years is developed by requesting that each unit of the organization submit "askings" for the next budget period. The numerical value of these requests for funds, are reviewed along with the recent history of previous expenditures. If the requests seem reasonable, the requests of the individual units are tentatively approved by each administrative level as they go through the channels from the department, to the dean of the school, to the academic vice-president, and to the president. Not all of these people along this route know for certain what funds will be available. Only the president knows the relative needs of the total institution. When all of the askings from all areas reach the president's office, and if the total requests from all units exceed the supply of available funds, (and they always will,) the requests of each unit may be arbitrarily reduced by a percentage which will adjust total requests to total apparent available funds, or salaries may be allowed and supplies cut. Because of this widely used, and historically acceptable approach to budget development, it soon becomes apparent to the wise administrator at each organizational level, that he must always request substantial increases and that he must be certain to spend all of his funds each year. Unspent funds means that the previous years expenses were overestimated, and as a consequence, next year's level of expenditure may be reduced. In this game, exhaustion of funds is proof of need. The person who uses his funds carefully, who perhaps seeks economies, who does not spend all that is available to him, is in danger of having his budget reduced. The system rarely allows him to use funds carefully natured in one area for activities in another area because of the "line item" concept. This concept insists that funds must be used for the purpose they were originally budgeted - salaries, equipment, or general expense.

If funds are not spent for the original purpose for which they were budgeted (authorized), they revert back to the general fund where they may be re-authorized for the same or some other need for the following year. Since educational institutions have always been short of funds, and there is a desire to move unspent funds to another area of need, it is understandable why this practice has developed. This is the budgeting and accounting procedure that continues to be used by most non-profit organizations, including various levels of government. It provides a detailed record of how funds are spent.

This system does not attempt to say whether or not the funds were spent wisely, and whether or not the taxpayers, parents, donors, students and other benefactors are getting their money's worth. What constitutes "their money's worth," is not easily evaluated, but program budgeting attempts to add this dimension to the authority, control, and stewardship functions of fiscal accounting and budgeting.

To give an additional dimension to the review of budget requests, it has been suggested that each organizational unit submit three levels of requests. One level is 10% less support then granted the previous year, the second level is the same level of funding, the third level is a 10% increase in support for the next year. For each of the three levels, a description of what would be gained or lost in terms of activity is submitted. This information gives the decision maker some feel for the impact of funding different programs at different levels. This is the kind of decision supporting information that program budgeting seeks to provide, though with even greater amounts of detail, and applicable to a wider variety of levels of spending including discontinuance of the activity.

PROGRAM BUDGETING IN THE FEDERAL GOVERNMENT

In September of 1961 the Air Force Systems Command asked the RAND Corporation to participate in establishing a course in the techniques of weapon (support) system cost analysis.[2] The Air Force interest in cost-benefit analysis spread to the entire Department of Defense and beyond during the following four years. This capped a fifty year history in the development of program budgeting, and on August 25, 1965 President Johnson announced at his news conference, that program budgeting was to be introduced into the entire federal establishment.

The goals of the process are perhaps best described using President Johnson's words:

"...Under this new system each Cabinet and agency head will set up a very special staff of experts who, using the most modern methods of program analysis will define the goals of their department for the coming year. And once the goals are established this system will permit us to find the most effective and the least costly alternative to achieving

American goals.

This program is designed to achieve three major objectives: it will help us find new ways to do jobs faster, to do jobs better, and to do jobs less expensively. It will insure a much sounder judgment through more accurate information, pinpointing those things that we ought to do more, spotlighting those things that we ought to do less. It will make our decision-making process as up-to-date, I think as our space programs." [3]

Program budgeting is not entirely new. A. E. Buck, in his article on "Performance Budgeting for the Federal Government,"[4] reports that the first experiment in program budgeting, then known as "cost data" budgeting, was applied to the public works activity of the borough of Richmond in New York City in 1912. Its use in the federal budgetary process was sporadic, however, until the 1930's, when both the Department of Agriculture and the Tennessee Valley Authority employed program budgeting. Other federal agencies began to develop budgets on a program basis and in 1949 the commission on organization of the executive branch of the government (Hoover Commission) recommended that the entire budgetary concept of the federal government be refashioned by the adoption of a budget based on functions, activities and projects. The commission designated it a "performance budget." In fiscal year 1956, the Department of the Interior's "'Mission '66' A Ten-year Program for the National Park Service" received congressional approval. In 1961, the Director of the Bureau of the Budget released a ten-year projection of all federal expenditures, the first official comprehensive long-range projection. That same year, the Federal Aviation Agency placed its programs on a five-year planning basis. The Department of Defense applications, however, provided the impetus which carried it to the adoption level announced by President Johnson. Program budgeting is no instant panacea, however, and its adoption by colleges and universities will raise many of the problems encountered in the federal government plus all of those inherent to the uniqueness of the academic community.

THE TEN STEPS IN THE PROGRAM BUDGETING CYCLE

Program budgeting provides great visibility to the decision-making process particularly in reference to the allocation of resources. This visibility occurs because at each step of the procedure there is an opportunity to display the conclusions that have been drawn, and the reasons why they were reached. This normally involves tradeoffs--the selection of one course of action in preference to a second or third, for reasons which are identifiable. They may not always be quantifiable, but identifiable. This is the reason for describing program budgeting as a rational process, providing a basis for the systematic selection of a preferred course of action. This visibility naturally has an impact on the political environment in which decisions are made. For that reason program budgeting will be accepted with different degrees of warmth by different people depending upon the current distribution of resources and how the future distribution of resources might be affected by a new method of establishing priorities. The impact of program budgeting on the organization will be discussed at greater length in subsequent sections, as will each of the following steps which describe the entire program budgeting process:

1. The objectives of the institution must be identified and goals established which would satisfy these objectives.

2. All of the programs which might reasonably accomplish these goals are then developed. This accommodates and encourages all of the innovation the viable institution is seeking.

3. The costs, or resource requirements--money, people, facilities--for each of the alternative programs are assigned.

4. The benefits, or goal-satisfying potential of each of the alternative programs are identified. This is a new dimension required by program budgeting and also one of the most difficult to accomplish. It is intrinsic to developing priorities.

5. To quantifiable costs and benefits, the decision maker must add his own assessment of the difficult or impossible to quantify--quality, personnel, potential, political expediency,--and select those alternatives which appear to best satisfy the objectives and goals of the institution.

6. The long-range fiscal implication of those decisions are tested by projecting their impact over the next five to ten years.

7. The annual budget is developed from the data for the current year of the long-range fiscal projections.

8. The program alternatives which were selected, budgeted and implemented are evaluated to see if the anticipated

benefits were actually realized.

9. The costs of the selected alternatives are reviewed to develop new standards to be used in assigning resource requirements to new program proposals and other alternatives.

10. The cycle is repeated on a continuous basis to allow for changes in objectives and goals, for new program innovations, for changes in available resources, and to accommodate changes in the environment in which the institution operates.

THE PROGRAM CONCEPT

The purpose of program budgeting is to provide visibility to activities--what do they cost and what do they accomplish. In conventional budgeting, activities are grouped by organizational units--a university, college, academic department or perhaps a service unit, such as admissions. It is not always easy to identify the accomplishment of a large unit. Nor does the decision-maker necessarily wish to rank priorities based on total organizational units. The term program is applied to a grouping of activities for which costs and benefits can be identified. The contrast between the contemporary budget format utilizing organizational units, and a program format can be seen in Exhibits 1 and 2. Exhibit 1 is the familiar line item budget for an academic department. Exhibit 2 presents the same total expense assigned to the seven programs that represent the activities of that department. The information about how the faculty uses their time was obtained from a form similar to that shown in Exhibit 3. The faculty load index shown in Exhibit 2 is the distribution of a 45 hour week for each of 8.6 full time faculty included

NEDRAP UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING

BUDGET CODES		BUDGET
12-112	Salaries - Instruction	$121,950.00
12-114	Salaries - Lab Assistants	9,216.00
12-115	Salaries - Clerical	5,000.00
12-120	Salaries - Student	8,500.00
12-121	Salaries - Graduate Students	4,800.00
12-135	Travel	2,875.00
12-137	Printing	275.00
12-140	Fed. Equip. Grant Matching Funds	6,650.00
12-151	Equipment Repair and Maintenance	135.00
12-155	Equipment Rental	1,620.00
12-180	Supplies - Office	850.00
12-182	Lab Supplies	5,000.00
12-183	Instructional Supplies	2,000.00
12-210	Staff Benefits	14,676.00
12-242	Goodwill	100.00
12-500	Office Equipment and Furniture	500.00
12-502	Lab Equipment	10,000.00
	TOTAL	$194,147.00

CONVENTIONAL BUDGET FORMAT

Exhibit 1

UTILIZATION OF RESOURCES

DEPARTMENT OF ELECTRICAL ENGINEERING

FACULTY TIME	Number Sections	Number Students	Units	SCH	Load Index
Instruction					
Lower Division	1	27	4	108	4
Upper Division	15	338	5	1,690	75
Graduate	72	1,942	2	3,884	144
Dept. Sponsored Research					71
Administration					25
Counselling					
Undergraduates					30
Graduates					40
				TOTAL LOAD	389

ALLOCATION OF DEPARTMENT EXPENSES TO PROGRAMS

PROGRAMS	FACULTY SALARIES	OTHER SALARIES	OTHER	TOTAL
Lower Division	$ 1,255		$ 225	$ 1,480
Upper Division	23,500	$22,516	13,605	59,621
Graduate	45,200	5,000	23,175	73,375
Dept. Sponsored Research	22,200		2,660	24,860
Administration	7,850		2,340	10,190
Counselling Undergrads	9,400		1,176	10,576
Counselling Graduates	12,500		1,500	14,000
TOTAL EXPENSE	$121,950	$27,516	$44,681	$194,147

PROGRAM BUDGET FORMAT

Exhibit 2

FACULTY SERVICE REPORT

FACULTY SERVICE REPORT

Name Payroll No. Salary Account No. Salary Account Name Semester Page No.

DIRECTIONS: After reading the accompanying definitions and instructions, please list below the average number of hours per week you spend on the activities listed below. Do not include activities for which you are paid from another salary account; do not include activities carried out on your own time which are not related to your profession, department, or to the University. The completed form should be returned to your departmental chairman or the dean of your school.

1. INSTRUCTIONAL AND INSTRUCTIONALLY RELATED ACTIVITIES

a. Regularly organized classes

Department Name	Course Number	Number Enrolled	AVERAGE HOURS/WEEK	
			Hours in Class	Preparation * and Supervision

*Include time spent in paper grading, preparing examinations, conferring with students and supervising teaching assistants.

AVERAGE HOURS PER WEEK

b. Supervision of readings and research courses and dissertations. Service on doctoral committees and examinations. (Do not include courses listed above.) ______ b.

2. ACTIVITIES RELATED TO ACADEMIC DISCIPLINE

AVERAGE HOURS PER WEEK

Personal research and/or creative work ______ a.

**Contract or grant research ______ b.

**Supervision or administration of contract or grant research ______ c.

Activities related to professional organizations (service on committees, attendance at conferences, editing journals, etc.). Please list representative organizations. ______ d.

Other activities. Please describe. ______ e.

**See section 2b and 2c for distinction

3. ACTIVITIES RELATED TO DEPARTMENT, SCHOOL, OR UNIVERSITY MANAGEMENT

Administration: departmental (or segment of department), school wide, or university-wide. (departmental chairman or assistant, administering proficiency exams, dean's office) ______ a.
Please list.

Student advising (not related to classes taught) Undergraduate ______ b.
Graduate ______

Committee assignments: Departmental, (e.g., curriculum committee) School, (e.g., policy, promotions) All-University, (e.g., Athletics, Improvement of Teaching). Please list. ______ c.

Other activities. Please describe. ______ d.

4. UNIVERSITY-RELATED PUBLIC SERVICE

AVERAGE HOURS PER WEEK

Include speeches to outside organizations, (PTA's, service clubs) advising or service to governmental agencies or community groups, and consultative services for which you do not receive extra compensation. Please describe the activities you include here. ______ a.

TO BE COMPLETED BY CHAIRMAN OR DEAN

1. If staff member is employed full-time on this account this semester, write 100 (%) in the space provided; if half-time on this account, write 50; etc. ______ %

2. Please return promptly to:
BUREAU OF INSTITUTIONAL RESEARCH
INDIANA UNIVERSITY

Signature ______
Chairman of department or dean of school

Exhibit 3

in this budget. Further analysis of this data would provide, for example, the tuition generated by the courses, or costs per student credit hour. Less easily measured are the benefits of the counselling activities, department sponsored research (in contrast to externally supported research,) and administration.

It can be seen that the selection of activities to group as programs is fairly arbitrary. For example, the University of California-Irvine, uses four program elements: instruction, non-instructional research, non-instructional service, and innovation and experimentation.

The purpose for selecting this particular program grouping was to illustrate how a concern for a particular program such as counselling would require identifying the expense related to it. This would help study the counselling activity to consider other alternatives. For example, some institutions, assigned the counselling of undergraduates on a full time basis to those faculty members who prefer this kind of activity. They then relieve other faculty members of the counselling assignment. Without identifying the economics of alternate counselling programs, it would be difficult to arrive at a decision concerning the desirability of adopting a program of faculty specialization in academic counselling.

While each institution could develop its own program classification, there is a national Management Information System program, being developed by the Western Interstate Commission for Higher Education. The categories they are proposing are shown in Exhibits 4. These are still in the preliminary stage and therefore, are subject to

WICHE MANAGEMENT INFORMATION SYSTEMS PROGRAM
ORGANIZATION OF THE PROGRAM CLASSIFICATION STRUCTURE

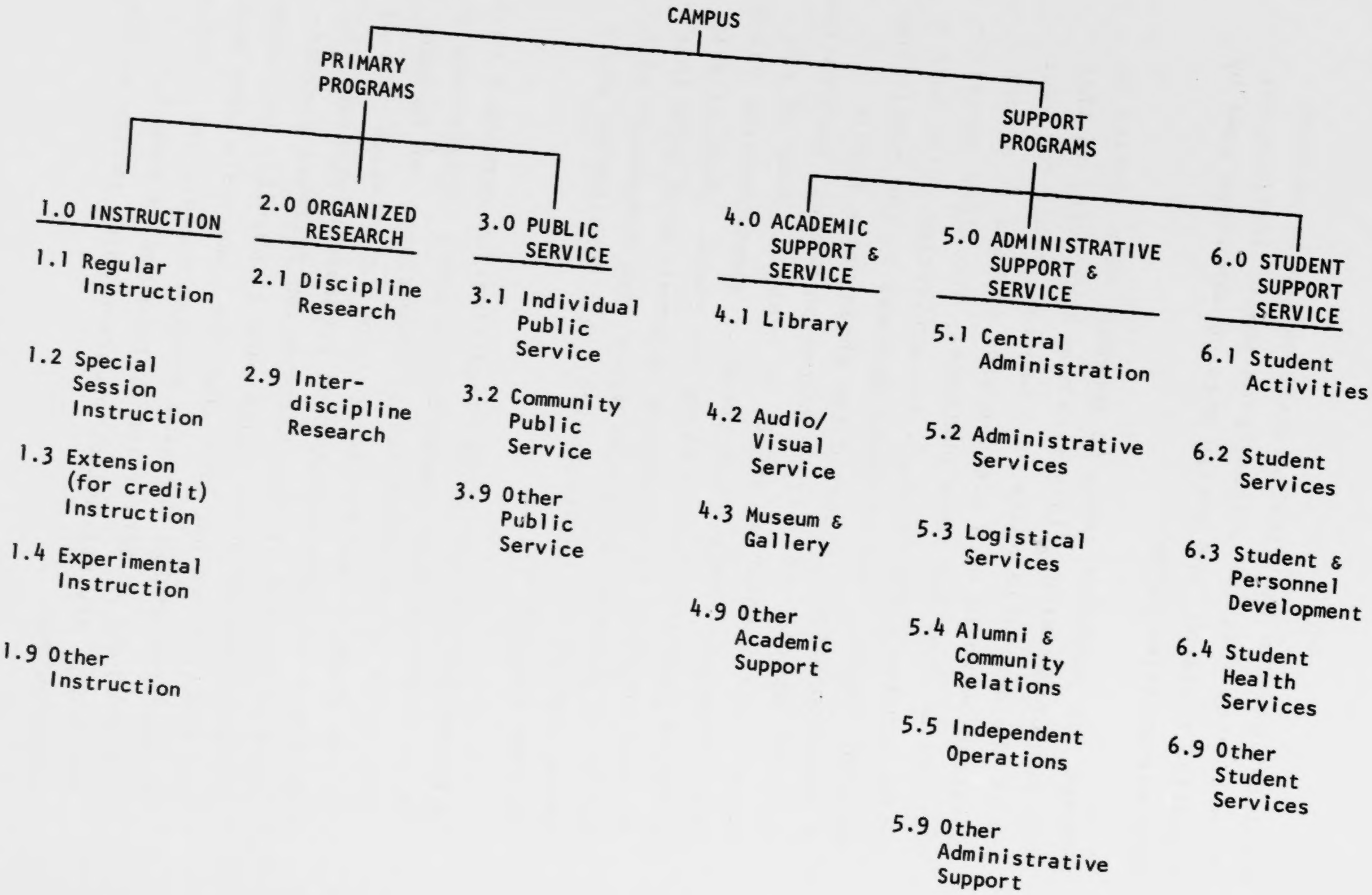
CAMPUS
PRIMARY PROGRAMS
SUPPORT PROGRAMS
1.0 INSTRUCTION
1.1 Regular Instruction
1.2 Special Session Instruction
1.3 Extension (for credit) Instruction
1.4 Experimental Instruction
1.9 Other Instruction
2.0 ORGANIZED RESEARCH
2.1 Discipline Research
2.9 Inter-discipline Research
3.0 PUBLIC SERVICE
3.1 Individual Public Service
3.2 Community Public Service
3.9 Other Public Service
4.0 ACADEMIC SUPPORT & SERVICE
4.1 Library
4.2 Audio/Visual Service
4.3 Museum & Gallery
4.9 Other Academic Support
5.0 ADMINISTRATIVE SUPPORT & SERVICE
5.1 Central Administration
5.2 Administrative Services
5.3 Logistical Services
5.4 Alumni & Community Relations
5.5 Independent Operations
5.9 Other Administrative Support
6.0 STUDENT SUPPORT SERVICE
6.1 Student Activities
6.2 Student Services
6.3 Student & Personnel Development
6.4 Student Health Services
6.9 Other Student Services

Exhibit 4

modification when the final classification is adopted. You will note that the primary programs of instruction, organized research, and public service are those used by many universities today.

Perhaps the important thing to remember when looking at this particular WICHE classification structure, is that one of the desirable goals of a program format for your organization would be a presentation of data in a form that can be used for other purposes. The WICHE classification program seeks to allow two activities which have a national impact. One of these purposes is the completing of questionnaires--in particular those which have a national impact. The Higher Education General Information Survey, better known as HEGIS, is typical. Many of you have encountered this thick sheaf of questionnaires which comes to your institution every two years. Hopefully if it were possible to accumulate information in your institution by program categories which were compatable with those used on the questionnaire, this compilation would be much simplified.

A second use for the WICHE classification structure would be to encourage some compatibility among institutions so that valid inter-institutional comparisons can be made. If for example, one wished to know the relative cost of the lower division instruction program in physics, it would be helpful if this information followed a classification system which would make it possible to compare two institutions and know that the same costs were being accumulated within the same program definitions. Since the grouping of activities by programs is somewhat arbitrary, why not select programs which relate to other institutions.

A COMPREHENSIVE APPROACH TO UNIVERSITY MANAGEMENT

The term systems analysis is used to describe a procedure in which each institutional activity is studied not only by itself, but also in relation to all other programs or activities. This is why Planning, Programming and Budgeting is called a system, for it encompasses all activities in the institution. This not only means that money spent on one activity is therefore not available to spend on another, but also that the admission's office cannot change the size of the freshmen class without relating it to nearly every other University office. The systems approach requires that both the parts and the whole be considered as a total, interrelated, integrated, inter-dependent, system.

II THE PROGRAM BUDGETING CYCLE

It should be recognized that the program budgeting procedure is a continuous process. While the ten steps listed below might be undertaken in sequence the first time, after that some would be conducted simultaneously and all would form a repetitive cycle.

ESTABLISH OBJECTIVES AND GOALS

Program budgeting uses the objectives of an institution as a basis for comparing alternate programs to see which most nearly matches the objectives. The programs which appear to best satisfy the objectives and are within available resources, are chosen. This is the process of establishing program priorities. To rank programs, it is first necessary to carefully enumerate what the institution wishes to accomplish -- what are its objectives. When quantified, that is, stated in numerical values, these objectives become goals. A small, coed, liberal arts college is a general statement of objectives. An enrollment of 2000, with 15 majors leading to bachelor's degrees, are goals. This is not just a semantic difference, but underscores the need for precision in stating objectives and goals. Without this precision, it is not possible to review the institution's operation at the end of the year and measure the success with which objectives and goals are reached.

A specific statement of objectives and goals may result from a self study which is described in a later section. To aid in its preparation, a check list of topics is included in Appendix A. For the first draft, the objectives of another institution can be used as a guide, with deletions and additions. A final statement of objectives should not be sought until the entire planning cycle is completed. Only when it is necessary to make a choice from among alternates, is it possible to know if the statement of objectives is adequate. When it does not provide adequate guidance, the objectives will need further refinement. They must lead to a statement of specific goals. Should the institution undertake two, or four, five and seven year degree programs. What academic disciplines should be represented at each level. Size, quality of students and faculty, methods of instruction, course structuring, calendar, concern with value orientation, the desired residential environment (or none at all,) each contributes to a description of what the institution hopes to accomplish. It is possible to begin objectives (and the catalog) with a classical statement:

"To Help Qualified Students Prepare Themselves Mentally, and Physically, for Moral, Intellectual, Social and Aesthetic Self-Fulfillment and Leadership." With this statement, any activity known to a university would be acceptable. Further refinement will be necessary if the objectives are to provide planning guidance.

Most institutions will undertake instruction, research and community service, but with a different emphasis on each. One of the major changes in emphasis currently being proposed for higher education, is for it to assume a more active role, and even leadership, in social action programs. It has been suggested that higher education is the only remaining institution in our society which has the capability to solve these problems and implement their solutions. This represents a further movement away from the traditional focus on intellectual pursuits. Should this be an objective of your institution.

The translation of objectives into goals requires the selection of specific levels of achievement. It is then possible during the evaluation phase to determine if goals are being attained, and possible alternates if they are not. Examples of specific goals would include:

Student Characteristics

- 3000 undergraduates
- 60% men, 40% women
- Average high school G.P.A. 3.55 for freshmen
- Average SAT V-650 M-630
- Scholarship assistance for all who qualify and have need
- Transfers admitted to balance upper and lower division

Activities

- 25 undergraduate majors
- Master's in 10 disciplines
- PhD in three disciplines
- A community theatre

Faculty

- PhD degree for all new additions
- Regional eminence
- Salaries: AAUP 95th percentile
- Student-faculty ratio: 16.0 to 1

Facilities

Office for every faculty member
Accommodate classes in 6 daily class periods
Classrooms to average 30 students
Classroom utilization 66% based on a 32 hour week (no classes scheduled on Wednesday)

Finances

Tuition comparable with private institutions in the same AAUP faculty salary bracket

Arriving at a statement of objectives and goals requires at least two steps, identifying possible objectives, and, selecting which objectives are to be pursued. This selection is part of the decision function and therefore part of governance. It will require resolution of the differences among students, faculty, administrators, and the governing board who will each place different values on different objectives. This reflects not only an absolute difference in opinion about which objectives to pursue, but also the difference in importance related to the role of the individual. A regent, whose primary concern is with financial survival of the institution will rank this objective higher than a student, whose interest in financial survival of the institution may be so remote that he will move this objective lower on his priority list. Using the instrument developed by Gross and Grambsch[5] the preferred objectives (not as they perceive them--how they wish they were) of students, faculty, administrators and regents in a predominately undergraduate university, is shown in Exhibit 5 The ranking of each of the first five objectives selected by

COMPARISON OF THE OPINIONS HELD BY STUDENTS, FACULTY, ADMINISTRATORS, AND REGENTS ABOUT THE GOALS OF A MIDDLE-SIZED PREDOMINATELY UNDERGRADUATE UNIVERSITY

	RANK ORDER OF IMPORTANCE			
WHAT THE GOALS SHOULD BE:	STUDENTS	FACULTY	ADMIN.	REGENTS
Produce a well-rounded student, that is one whose physical, social, moral, intellectual and esthetic potentials have all been cultivated.	1		2	2
Keep up to date and responsive.	2			4
Maintain top quality in all programs in which we engage.	3	2	4	3
Develop the inner character of students so that they can make sound correct, moral choices.	4		3	1
Protect and facilitate the students' rights to inquire into, investigate, and examine critically any idea or program that they might get interested in.	5			
Protect the faculty's right to academic freedom.		1		
Produce a student who, whatever else may be done to him, has had his intellect cultivated to the maximum.		3		
Train students in methods of scholarship and/or scientific research, and/or creative endeavor.		4		
Make sure the university is run by those selected according to their ability to attain the goals of the university in the most efficient manner possible.		5	1	
Increase the prestige of the university or if you believe it is already extremely high, insure maintenance of that prestige.			5	5

Exhibit 5

each group, students, faculty, administrators, and regents, is shown. It can be seen that only one, "maintain top quality in all programs" was ranked in the top five by each of the four groups. In the faculty first five, three were not ranked by any other group. The students selected only one objective not mentioned by anyone else "protect and facilitate the student's right to inquire into any program that interests them." The students and regents agreed on "keep up to date," perhaps because it applies primarily to the faculty and administrators.

It would be interesting to see if the objectives selected by this group, over two years ago, would remain the same today. For example, the item "serve as a center for the dissemination of new ideas that will change the society, whether those ideas are in science, literature, the arts, or politics," was ranked 11th by faculty and by the students.

Compared to the seven top objectives recorded in the Gross and Grambsch study for major universities involved in both doctorate programs and commensurate research activities, two items were included which were not on the predominately undergraduate university list. These included:

> "ensure the continued confidence and hence support of those who contribute substantially (other than students and recipients of service) to the finances and other material resource needs of the university."
>
> "Carry on pure research."

A review of these items illustrates the difference between objectives and goals, "Keep up to date and responsive" is a reasonable statement of an objective, but it would have to be translated into something more specific to relate it to institutional operation. Perhaps a goal would be "adequate travel money to insure that every faculty member attends the national meeting of his academic discipline at least once a year," providing, of course, that this is considered an encouragement to "keep up to date."

The resolution of differences of opinions about the objectives and goals of an institution might be accomplished by what has been called the Delphi method.[6] Originally developed by the Rand Corporation for obtaining greater consensus among experts on defense problems, it proposes to alleviate face-to-face confrontation which can lead to defensive stands, personality conflicts, hasty conclusions, and the obfuscation of verbal elloquence. The method requires individual consultation of the participants in several successive sessions. This can be done by questionnaire. The questionnaire can be developed from an initial solicitation of objectives and goals from each of the participants, or a questionnaire can be developed independently and submitted to members of the group as the initial step.

Each participant is then asked to rank each objective using a scale in the manner of Gross and Grambsch, "absolutely top importance, great importance, medium, of little importance, or no importance." The composite ranking by all of the participants is then returned to each respondent. If his opinion is in the minority, he is asked to revise it or give the reasons why he prefers to remain in the minority. Each participant then receives an updated summary, a listing of minority opinions, and a final change to revise his position. This approach affords the opportunity for careful consideration, an infrequent activity in most committee meetings.

The planning activity should not delay too long on the initial step. Objectives will change, and they will require further refinement. They should be made available as a current statement of what the university is trying to achieve. They provide all of the academic community with a record of direction and goals at any one time. If the direction is changed, the change should be visible to all whose activities will be mutally supporting as long as they are directed towards the same ends.

DEVELOP ALTERNATE PROGRAMS WHICH WILL ACCOMPLISH GOALS

The number of degree programs offered, the degree level provided, the combination of large or small sections, high or low faculty-student ratios, the degree of involvement in sponsored research, are but a few of the alternates from which an institution must select in developing the strategy by which it reaches its goals and objectives. Pursuing the program concept, activities are grouped as programs in a manner which will allow their identification by the resources required, and the benefits to be gained.

In the conventional budget procedure the review of programs is generally limited to new proposals -- what activities will be added to the existing budget. Program budgeting requires the retention of program identification by costs and benefits for all programs, existing and proposed. A new program is then compared not only to other new programs but also to all existing programs. In essence, total institutional priorities are reviewed each time alternatives are considered. This approach will be met with resistance by those who already have established programs. New programs are not a threat to them as long as new programs are supported only out of new funds. When each program automatically competes with all existing programs, the political environment in which allocation takes place has changed. The conflict between haves and have-nots will not be eliminated, but the ground rules for seeking priorities will have changed. It is for this reason, that each program is in competition with all other programs, that the concept of program budgeting should be compatible with the concept of the university as a forum in which new ideas, new approaches, are debated, evaluated, and selected on the basis of their contribution to achieving the goals of the institution. An example of institutional strategy involving section size alternates was proposed by Ruml in 1959.[7] He suggested that if an institution wished to have small tutorial sections in which a close faculty student relationship could be maintained, it would be necessary to balance these with a number of very large lecture sections so that the small sections could be economically feasible. Two of the alternative combinations he proposed are displayed in Exhibit 6. Table A shows the effect of sections averaging 180, 90 and 10 students. Table B the effect of

TABLE A

POSSIBLE COMBINATION OF COURSES FOR A COLLEGE WITH 3,000 STUDENTS

A Courses: 50,	Large Lectures Averaging 180 Students	=	9,000 Course Registrations
B Courses: 100,	Lecture-Discussion Averaging 90 students	=	9,000 Course Registrations
C Courses: 900,	Seminar-Tutorial Averaging 10 students	=	9,000 Course Registrations
Total 1,050	Courses or Sections	=	27,000 Course Registrations

TABLE B

ALTERNATE COMBINATION OF COURSES FOR A COLLEGE WITH 3,000 STUDENTS

A courses: 100,	Large Lectures Averaging 90 students	=	9,000 Course Registrations
B Courses: 200,	Lecture-Discussion Averaging 45 Students	=	9,000 Course Registrations
C Courses: 750,	Seminar-Tutorial Averaging 12 students	=	9,000 Course Registrations
Total 1,050	Courses or Sections	=	27,000 Course Registrations

TABLE C

FACULTY REQUIREMENTS

Number of Courses	Average Section Size	Number of Faculty 3 Course Load	Number of Faculty 4 Course Load
	TABLE A		
50	180	17	13
100	90	33	25
900	10	150	112
	Total Faculty	200	150
	Student-Faculty Ratio	15:1	20:1
	TABLE B		
100	90	33	25
200	45	67	50
750	12	125	95
	Total Faculty	225	170
	Student-Faculty Ratio	13:1	18:1

Exhibit 6

sections averaging 90, 45, and 12 students. The total number of courses offered and the course registrations remain the same. Table C shows the effect of varying the faculty given the section sizes in tables A and B. It can be seen that the faculty requirement varies from a low of 150 to a high of 225 under different assumptions. Also shown is the student-faculty ratio--an index of staffing requirements. This ratio by itself can be used to compute staffing costs. It is really a composite of the variety of courses taught, average section size, average faculty teaching loads, and enrollment, and can be varied by changing any one of the four. There have been a number of studies of section size which indicate that there is as much "academically measurable" learning in large sections as in smaller ones. There has been limited inquiry into the benefits of small sections to the psychological needs of the students. This leaves this determination open to additional research. Within the instruction program, a further subdivision of programs will be by academic programs. The number of programs to be offered is a major program alternative. Some additional analysis is helpful. Exhibit 7 includes the number of degrees awarded in the United States in the nineteen undergraduate majors offered by Nedrap University. It can be seen that business, English, history, psychology, and mathematics are the programs which currently are granting the most degrees. If a college were just starting, and it wondered what the students would take, this would be a reasonable distribution from which to begin planning. Of course, the enrollments in all schools will not follow this pattern. An all male or an all female enrollment would bias the selection. There are geographical differences, mining,

PROJECTIONS OF JUNIORS BY MAJOR BASED ON NATIONAL STATISTICS

MAJOR	PERCENT US DEGREES 1967-68	ESTIMATED JUNIORS BASED ON NAT. STAT.	NEDRAP JUNIORS FALL, 1969
Business	21.0	144	174
English	12.5	86	44
History	9.4	54	93
Psychology	7.3	50	27
Mathematics	7.2	49	26
Sociology	5.9	40	26
Biology	5.5	38	51
Political Science	5.4	37	31
Social Science	4.4	30	34
Economics	4.1	28	30
Chemistry	2.7	19	13
Electrical Engr.	2.7	19	25
Mechanical Engr.	2.1	14	24
French	2.0	14	13
Theatre Arts	2.0	14	8
Spanish	1.8	12	13
Civil Engr.	1.5	10	32
Physics	1.3	9	8
Philosophy	1.1	8	13
TOTAL	100.0%	685	685

Exhibit 7

agriculture. A particulary outstanding department will bias the distribution. For planning, these are normal distributions of student interests at a given time. Few departments will be able to attract students in a significantly disproportionate pattern unless they are assigned a unique role in a multi-institutional system. A school that elects to do degree programs in specialized fields must recognize that enrollments in these areas will always be relatively small. If a major cannot enroll at least 20 students at the junior level, it will be very expensive to offer the upper division required courses. It could be assumed from this discussion that a school should only pick "volume" curriculum. If the financial resources of the institution are limited, this could be a wise approach. Even with the largest institution, there will always be the next alternative of initiating a major of limited interest. For those who have the resources, fine. What is important, is for a school with limited resources, who selects a program which will require it to swim against the current, may jeopardize its future try to achieve an enrollment level which is probably unrealistic. An institutional objective of developing an outstanding undergraduate department in sanscrit should recognize the faculty, and scholarship resources that are necessary to achieve this goal, and to be certain that this is a part of a deliberate plan, not an accident of time, or the individual aspiration of a faculty member who knows sanscrit. The appeal of less obviously obscure disciplines are not always so easily identified.

The attitude which program planning attempts to create may be more apparent considering the following;

1. An institution may select any combination of programs it wishes. One of its goals may be to play a truly unique role in higher education. The resource implications of this uniqueness should be clearly understood.

2. An alternate is to select a reasonably standard program, and develop a unique environment for presentation. This approach may have a greater impact than an inadequately supported discipline uniqueness.

3. The hetergeneous nature of higher education suggests that an institution can select one portion of the total spectrum of activity and by absorbing that part, free others to make other contributions.

4. The freedom to select new roles lessens as an institution develops facilities, faculty and competence in an area. This built-in commitment creates an inertia which is difficult to reverse if the benefits of the program decline. It is for this reason, that the long range resource impact of all program proposals should be carefully developed.

5. There is an inherent conflict between the maximizing of institutional goals and the personal goals of individual faculty members. This has been described by many authors. The satisfaction of the maximum number of institutional goals may be in conflict with the professional development of a faculty member such as the potential chairman of the sanscrit department.

There is a tendency when discussing educational strategy to concentrate on those easily measured factors which effect costs--section size, faculty loads, building costs. It will be necessary to constantly insure that the academic programs of the institution also receive adequate attention. This may not be easy. Despite discussions of computer aided learning, the use of visual aids, the advantages of field trips, the time to be saved and the value to the student of independent study, most instruction is still in the classroom with a lecture to the students and where the dialogue is limited. Perhaps next to measuring benefits, the most difficult phase of the program budgeting procedure, will be to encourage the development and implementation of truly unique and meaningful educational experiments. The academic programs may be a secondary concern to administrative functions without a constant effort to refocus on the central purpose of the university. Program budgeting can help encourage new developments when it is established that a new program, a new approach, does indeed have a chance because of the visibility given to all programs.

ESTIMATE RESOURCE REQUIREMENTS FOR EACH ALTERNATIVE

The term resource is used to describe all of the support a program requires. Resources include salaries, space, supplies equipment and all the other needs translated into their dollar equivalents. Resource is therefore an all inclusive term to include the direct and indirect support a program requires.

The simplest resource calculations are those related to classroom teaching. If there is a standard faculty teaching load, the salary of the full time faculty member can be readily allocated to each of his activities. This was the approach illustrated in Exhibit 2. Totaling all of the students enrolled in each course, and dividing this total into the faculty costs, a faculty teaching cost per student credit hour is readily calculated. If all of the departmental costs, including counselling, administration, equipment and clerical are totaled, they too can be allocated in the same manner. Extended one step further, all university costs can be totaled, divided by the total annual student credit hours, and a total university cost per student credit hour, calculated. These may then be listed from high to low, and in nearly every institution the same results would occur: the lowest cost courses are lower division humanities, the most expensive are in the professional schools. This is the cost accountant's approach to establishing a product's sales price. The major advantage to accumulating costs in this manner is to learn their nature. Is the cost of a program high because of the high costs, or the low course enrollments. Are the low course enrollments caused by course proliferation or low levels of student enrollment. Should there be selective admissions to increase enrollments in some disciplines.

Some analysts distinguish outputs and benefits. Student credit hours would be considered outputs. Benefits would be measures of how the students had profited from the courses. What did they learn, how did the course influence their lives. Because of the difficulty of identifying and measuring benefits, outputs are used interchangeably.

There may be an over-emphasis on the calculation of unit costs for courses because the data is readily available. When non-instructional programs are reviewed, it is considerably less easy to calculate benefits or outputs and relate them to a specific program. Since there is only one admission program, there is no internal basis for comparison as with academic programs. The unit cost per application processed has only an historical trend value. This is why inter-institutional data would be helpful. If you rank all of the academic departments by cost of student credit hour taught, some will be high, some low. Requests for more staff may be approved for the lower cost departments not for the high. But what about the admissions program. What should it be compared to. If it is allocated to each department on the basis of students enrolled, it becomes part of the unit cost calculation, but is it high or low in absolute measures. Costs per student admitted, compared to other schools, is a more meaningful measure, and this is why consistent statistics on costs and activities are sought by the nationally oriented management information systems projects.

Each institution will find it necessary to develop its own cost data. For academic discipline proposals, it is necessary to estimate faculty needs, non-academic personnel, equipment, supplies, and space. Data must be accumulated so that when the various alternates are presented, the resource implication can be assessed.

While some institutions would spend two or three years developing this data before initiating planning, this is not necessary. A data file will grow as a by-product of other studies. If necessary, estimates can be used, which are updated and refined as the result of the evaluation, after the program has been in operation.

Exhibit 8 includes examples of the kinds of standards developed by the University of California to use in projecting future space needs. While it is interesting to compare other agency data with your own, they are often not directly useable for a number of reasons:

1. Much cost data is old by the time it becomes available. Prices change rapidly.

2. Standards are often used in making allocations to an entire institution. They are gross figures. Any error can be compensated for when the allocation is made by departments or programs. If this same standard is used directly for a department, it may be in considerable error because it was developed as an average of a number of diverse disciplines.

3. Applying any formula without a thorough knowledge of how it was developed and the limits of its validity can simply lead to incorrect applications.

ESTIMATE BENEFITS TO BE GAINED FROM EACH PROGRAM ALTERNATIVE

The identification of program benefits is the most difficult step in the program budgeting procedure. The impact of a man's education can be seen relative to what he accomplishes in a lifetime, but this impact is difficult to relate to any one campus activity. This difficulty does not mean that we must abandon the program concept and cost-benefit analysis, but rather that additional effort be directed towards identification of benefits and their application. The case upon which additional support will be gained for higher education must be on what we hope to accomplish. It must be related to social benefits since we are competing with other social needs.

PLANNING STANDARDS

FACULTY PROJECTIONS

Total Faculty Projection is based on an Equivalent Lower Division Student-Faculty Ratio of 28 to 1.

Equivalent Lower Division Enrollments:

Lower Division	1.0
Upper Division	1.5
First Stage Graduate	2.5
Second Stage Graduate	3.5

The enrollments at each level multiplied by their equivalency factor give total lower division equivalent enrollment and divided by 28 give projected faculty.

A 12 to 1 Student to Total Academic Staff Ratio is used to allow for additional academic staff such as teaching assistants and research associates.

SPACE REQUIREMENTS

Assignable Square Feet Per Student Credit Hour is the basis for calculation of undergraduate needs. Full Time Equivalent for others.

Typical values for classrooms and seminar rooms (in assignable square feet per student class hour):

Physics Department - U/G	.53	ASF/SCH
Physics Department - Graduate	1.80	ASF/FTE
Political Science - U/G	.63	ASF/SCH
Political Science - Graduate	8.40	ASF/FTE

Typical values for class-laboratories:

Physics - Lower Division	1.81	ASF/SCH
Physics - Upper Division	2.63	ASF/SCH
Political Science - Lower Division	.24	ASF/SCH
Political Science - Upper Division	.09	ASF/SCH

Typical values for research and office facilities:

Physics - Graduate Students	160	ASF/FTE
Physics - Academic Staff	420	ASF/FTE
Political Science - Graduate	30	ASF/FTE
Political Science - Academic Staff	200	ASF/FTE

Source: *California Higher Education Facilities Planning Guide*, Office of the President, Vice President Physical Planning and Construction, University of California, February, 1970

Exhibit 8

There have been a number of attempts to identify the general benefits of higher education. Dressel[8] sought to relate the effect of the University of Michigan on the income of the state of Michigan. John Keller suggests fourteen items to which values could be assigned and applied to the alumni of an institution. These are listed in Exhibit 9.

Exhibit 10 is a cost-income analysis for departments in a School of Engineering. In effect, the costs of each department are assigned to each of three programs, lower division, upper division and graduate. The tuition generated in each of these three programs is also recorded. Comparisons between students taught and the cost of their instruction is presented. How might this be used. It might help with a decision concerning the addition of faculty to any one of the four areas. It might be used in determining if there was a reasonable relationship between cost of instruction and tuition charged. It can help in identifying the reasons for high costs. Are too many low enrollment sections involved. Should an effort be made towards selective increases in enrollment. Were faculty added at a time when sponsored research was readily available, and now they are being absorbed on the instructional budget. Have faculty teaching leads gradually been reduced. This is the kind of information helpful in evaluating the priorities of spending. It is also the kind of cost data needed for evaluating new proposals. Then there are the less easily answered questions that relate to these particular engineering departments.

1. Graduate study had been introduced primarily as a community service. It provided an educational opportunity

BENEFITS TO ALUMNI

1) First Offered Wage
2) Cumulative Income (Over 5, 10, 15 Years)
3) Proportion into Management Level (By Fifth or Tenth Year)
4) Number of Papers Published in Scholarly or Technical Journals
5) Rate of Election to Select Professional Groups or Posts
6) Proportion Teaching in Select Schools
7) Rate of Award of Civic and Professional Honors
8) Proportion Holding Governmental Posts of Significant Responsibility
9) Proportion Holding Elective Office
10) Voting Frequency
11) Rate of Participation in Local Civic Affairs (Fund Drive Chairmanship, Boy Count Leadership Posts, Etc.)
12) Drunkenness, Arrest, and Divorce Rates
13) Book and Magazine Reading Frequency
14) Personal Evaluations of Intellectual and Social Satisfaction

Source: John Keller, "Higher Education Objectives: Measures of Performance and Effectiveness," Seminar Papers, Western Interstate Commission for Higher Education, Boulder, Colorado, April 24, 1969, p. 79.

Exhibit 9

SCHOOL OF ENGINEERING

SUMMARY OF PROGRAM EXPENSES

	CIVIL	ELECTRICAL	MECHANICAL	APPLIED MATH
LOWER DIVISION				
Units	476	96	660	264
Income	$18,659	$ 3,763	$25,872	$10,349
Expenses				
FT Salaries	7,528	5,136	6,749	5,860
PT Salaries	0	1,266	1,266	0
General	3,230	1,311	9,303	625
Total Expenses	10,758	7,713	17,318	6,485
Balance	$ 7,901	($ 3,950)	$ 8,554	$3,864
UPPER DIVISION				
Units	1,815	2,000	1,470	0
Income	$69,569	$76,660	$56,345	0
Expenses				
FT Salaries	33,046	29,454	47,155	0
PT Salaries	6,334	0	0	0
General	7,454	41,899	33,064	0
Total Expenses	46,834	71,353	80,219	0
Balance	$22,735	$5,307	($23,874)	0
GRADUATE				
Units	324	4,191	818	2,454
Income	$12,960	$167,640	$32,720	$98,160
Expenses				
FT Salaries	11,678	66,958	27,766	22,664
PT Salaries	4,433	35,046	13,300	20,901
General	477	17,721	3,305	5,025
Total Expenses	16,588	119,725	44,371	48,590
Balance	($3,628)	$ 47,915	($11,651)	$49,570
ALL PROGRAMS				
Units	2,615	6,287	2,948	2,718
Income	$101,188	$248,063	$114,937	$108,509
Expense				
FT Salaries	52,252	101,548	81,670	28,524
PT Salaries	10,767	36,312	14,566	20,901
General	11,161	60,931	45,672	5,650
Total Expenses	74,180	198,791	141,908	55,075
Balance	$27,008	$ 49,272	($ 26,971)	$ 53,434

Exhibit 10

for the employed engineer. What are the benefits to these students, to the community and to the University which increasingly seeks support from the business community in which it is located.

2. The opportunity to participate in graduate level instruction increases the attractiveness of faculty berths to most potential faculty members. How does this influence the overall viability of the faculty in all of their assignments, lower and upper division, as well as graduate work.

3. How does the non-sponsored research program (if faculty loads are reduced for research) effect the viability of the faculty and in turn enhance the effectiveness of the institution.

4. Sponsored research contracts normally includes an overhead expense reimbursement which is a contribution towards general university overhead. If this activity were to be discontinued, would the general university overhead be decreased also, or would it be just another loss of income requiring that the remaining income sources carry a larger load.

These are the kinds of questions which occur when costs are displayed against benefits on a program basis.

DEVELOP AN OPERATING PLAN BY SELECTING FROM AMONG ALTERNATES

This step involves selecting that combination of programs that appear to best satisfy institutional objectives and goals within the resources available. This means establishing the priorities with which each program will be funded. A way of visualizing this procedure is to think of the process as being undertaken by a single person -- perhaps the president. He has 1200 pieces of paper. These include alternates A,B, and C for each of 400 programs. One of the programs is undergraduate scholarship assistance. Alternate A will support 200 students and cost $160,000 out of university funds. Alternate B will support 300 students and cost $210,000. Alternate C is to support 500 students, at a cost of $50,000. The more money spent on scholarships, the more the tuition needs to be raised next year for all of the students. Each alternate therefore represents a different cost, effects different numbers of students, and will have a different impact on the University. Alternate A provides an average of $800 for 200 students, B $700 for 300 students, C $100 for 500 students. The caliber of student that can be attracted to the institution considering only fiscal support, will, of course, vary with the level of individual support relative to the costs of the institution. These are some of the benefits that would need to be estimated for each alternate, and, of course, each is related to enrollment sought, tuition charged, the admissions interest, and similar factors.

The decision-maker can place any one of the alternate scholarship programs at any priority level he wishes among the four hundred programs to be ranked. The priority ranking can be changed as each of the alternates are reviewed. He must rank programs by goal satisfaction, and also by its resource requirement. Each time he considers the next program alternate he has a choice of adding it to the list of programs to be undertaken, or to use the equivalent resources to enrich (select another alternative) for one of the programs already given a priority ranking. When he is finished, he may have 337 programs in order of anticipated benefits, using alternative A for some, B or C for others; and their total falling within the resources available. Subsequently, this ranking will be tested for long range implications to determine if a program will grow at a rate that overdraws resources in the third year. Another program may be substituted or the overcost program modified.

TEST THE LONG RANGE FISCAL IMPLICATION OF THE PLAN

There are few decisions made about "one time only" resource allocations. Most decisions will affect the institution tomorrow and the next day, and next year for an indefinite period. The number of new majors that are started with a part-time appointment this year, one man next fall, a second man in two years, etc., are legendary. A decision to use tile corridor walls vs. painted walls, vs. vinyl coverings is a decision which will influence maintenance for the life of a building. While there may have been enough funds to initiate program Y last year, and project X this year, there may not be enough funds next year to let both projects grow at the rate necessary for both to reach a viable level.

So that the long range implications of each selected alternative program can be seen, a budget for each year during the next five to ten years is compiled. Each time that a decision is made about a resource allocation, its impact on future budgets is recorded. If a new major is started, its faculty needs are projected not just next year (the foot in the door) but also for each of the future years.

The ten year plan appears to be popular, and it is a time compromise. It is difficult to plan knowledgebly ten years in advance and to do so with any precision. Yet at the same time, decisions are being made today which will influence the institution far beyond ten years. Buildings are being built and will be used many years into the future. Faculty receive tenure and will have twenty to thirty years of service ahead regardless of what happens to the program for which they are hired. Ten years, therefore, appears to be a reasonable look at the future, even if you have confidence only in the three to five year data.

The terms modeling and simulation are used to describe compilation of annual budgets, ten years into the future using a computer. Exhibit 11 displays a simple "model" of a university. This simple model considers six items to develop a total budget situation. The major income item at most institutions is the annual tuition income or its equivalent in per student state appropriations. In this model 3000 students with an annual tuition rate of $1500 will generate a total tuition income of $4,500,000 plus $500,000 from other sources to give a total income of $5,000,000. On the expense side, this same enrollment must be taught by a faculty whose number will depend upon the student-faculty ratio selected by the institution. Using a ratio of 15 to 1, 200 faculty will be required. If the average salary of these faculty members is $12,000 there will be a total teaching expense of $2,400,000. Other expenses of the institution total $2,500,000 and the grand expense total of $4,900,000 allows a budget surplus of $100,000 in our simulated university. The purpose of modeling and simulation is to try alternate operating strategies. It is possible to vary the values of: enrollment, tuition, other income, faculty-student ratio, average faculty, and other expense, and see how they would

A SIMPLE UNIVERSITY MODEL

INCOME

Enrollment x Annual Tuition (or Unit Appropriation)		
3,000 x $1,500 =	$4,500,000.00	
Other Income	500,000.00	
Total Income		$5,000,000.00

EXPENSES

$$\frac{\text{Enrollment}}{\text{Student-Faculty Ratio}} = \text{Faculty}$$

$$\frac{3{,}000}{15} = 200$$

Faculty x Average Salary =	Teaching Expense	
200 x $12,000 =	$2,400,000.00	
Other Expense	$2,500,000.00	
Total Expense		$4,900,000.00
SURPLUS		$ 100,000.00

Exhibit 11

affect the outcome of the budget of the university. If, for example, the enrollment is raised by 200 students, the tuition income would increase, and the number of required faculty would increase. The faculty salaries and other expense would increase. How would this effect the over all budget. Or if we wish to improve the student-faculty ratio and have one faculty member for each 12 students how would this affect the budget. This is a simple model involving only six variables, but is illustrative of the kind of simulation that can be used in the planning process. Section IV describes a model with greater detail.

It would not be too difficult to extend this model by hand. As the model becomes more sophisticated, by attempting to predict each expense and income item more precisely, the manual calculations become laborious. This is the dimension the computer adds to simulation, it allows a more rapid calculation as new values for the different income and expense categories are tried.

There is a "trade off" with modeling and simulation. If the model is too simple, it will produce projections which are too remote from reality, which cannot be related directly to the operating budget. On the other hand, if they are too sophisticated, they are expensive and less easily understood. It is doubtful if they will become a part of the continuing planning activity. They may be of interest to institutional researchers, but not be an integral part of the decision making process. A balance between these two extremes must be developed for each institution and tailored to the needs of the persons engaged in the planning activity. Perhaps more than one kind of model will be maintained, a gross planning model with major variables included, and a more detailed model to incorporate the actual budgeting data, i.e. an annual budget generating mode. Despite the convenience of simulation, the planning activity should not wait for the availability of a comprehensive institutional model in which all variables will be inter-related and programmed to accommodate all changes.

COMPILE THE ANNUAL BUDGET

The reason for testing the long range fiscal implications of the selected alternatives, is to pick a combination which will match programs with resources in the immediate future. If five to ten year projections indicate the feasibility of undertaking the programs selected, then the next year of the long range plan, can become next year's operating budget. It may require translation into organizational unit allocations, but the planning totals should equal the operating budget totals. The planning activity continues to probe ten years into the future adding increased precision as the year's draw closer, and finally becomes next year's operating budget.

The ease of accomplishing the translation of the planning budget into the operating budget depends upon the compatability of the program and the accounting formats. Two approaches are currently being used, neither of which is entirely satisfactory. The first approach is to divide activities into enough programs that they each serve in effect as individual costs centers. These can be accumulated into whatever totals are desired for accounting reports. This requires a large number of programs.

The second approach is to develop a comprehensive account coding system so that funds, departments, programs, can be identified, and information accumulated into whatever report format meets a particular need. Much of the delay in developing program budgeting; is the need to develop a system that is compatible with current needs and still adds the program dimension. Much of this conflict comes about because of the need to assign financial responsibility to an individual. This is normally accomplished by following organizational lines--academic vice president, dean, chairman. However when programs cut across these organizational divisions, financial responsibility and program responsibility do not coincide. A new accounting scheme may evolve to accommodate these diverse needs. Or the organization might change to a program basis. Again, planning should not be delayed while waiting for this development to be resolved.

EVALUATE THE SUCCESS WITH WHICH PROGRAM BENEFITS ARE ACHIEVED

To evaluate is to measure whether or not a program as perceived actually accomplished its goals.

> "After you switched to speed reading techniques, were the third graders able to read faster, comprehend more, retain knowledge longer, as the experimental design suggested?"
> "No, but......"

One of the most visable results of the introduction of PPBS in the federal government is the creation of "evaluation" sections in most agencies. How successfully are the goals of the agency being achieved. Can programs for which perceived goals are not realized be discontinued and those funds freed to use on other programs. While colleges and universities have spent considerable time worrying about testing and grading of students, only periodic reviews by accrediting committees, approach any kind of evaluation of the success with which an institution is accomplishing its mission. With the competition for funds increasing, with the need for more detailed justification of needs, methods of evaluating programs will have to be designed into the original proposal. The program budgeting cycle requires review of alternates, and selection of those programs which appear to best satisfy objectives within the limits of available resources. The program is implemented. Then it is evaluated to see if it has accomplished the goals in the manner that was originally proposed. The reasons for success or failure are noted and fed back into the alternate selection process so that the next time priorities are considered, this experience is added to previous estimates of potential benefits.

This would encourage relatively modest estimates of benefits for a program recognizing that it will be evaulated at a later time, and the proposed accomplishments, and the real accomplishments will be compared.

In addition to the difficulty in evaluating such benefits as "development of character," there is another reason why the evaluation of program success is a difficult procedure to initiate in higher education. We all, somehow, have a nearly blind faith in cherished traditions. The small class size is an example. There are studies that indicate that factors other than section size influence learning as measured by tests of subject knowledge. Despite this evidence, most faculty do not believe it. Student response and interpersonal relationships are listed as benefits. How can these benefits be identified and measured if they are listed in support of the higher costs of small section sizes.

Faculty evaluation by students, course evaluation by alumni, student evaluation of their environment, measured achievements in cost-reduction, all are evaluations of the success with which programs were undertaken because we thought they would satisfy our objectives and goals. Without evaluation, support of decision-making is impossible.

REVISE PLANNING STANDARDS

Planning, programming, budgeting and evaluation is a continuous process. The projected costs and benefits of proposed alternative programs must be assessed as carefully as possible. A standard data file will have to be developed for each institution so that it can predict the consequences of its actions. While initially it may be necessary to estimate values, or borrow them from others, the experience gained by evaluating those programs which have been undertaken, can be used to update and refine the data file.

The term standards should be intrepreted as a record of current policy. A twelve hour teaching load, 110 square feet for a single occupancy faculty office, $3000 instructional support for each full time faculty position, a secretary for every seven faculty members, a counsellor for each 600 undergraduates, are values used in projecting program costs. These can be set as average values based on existing conditions. Or they can be values adopted as a policy for the institution. It is inevitable that exhaustive lists of these values will be developed and compared on an inter-institutional basis as the pressures for educational "cost accounting" grows. It should be recognized that a standard of different values provides different kinds of results. Large faculty offices may be essential where small seminars are encouraged. Perhaps a faculty office should be able to hold 10 students comfortably. The number of faculty that justify an additional secretary is dependent upon the type of activity in which they engage--research, number of papers and other writings, participation in national society activities. The adoption of a standard--one secretary for seven faculty members, without an awareness of these differences, and recognition that perhaps a ratio of 1 for 3, or 1 for 20 should be used, will lead to more rigid errors, than those being made currently. It is one thing to profit by someone elses experience. It is something else to adopt their values without knowing how they were developed.

REPEAT THE CYCLE TO ACCOMMODATE CHANGES IN OBJECTIVES, GOALS AVAILABLE RESOURCES, AND THE INSTITUTION'S ENVIRONMENT

This is a continuous process. Ideally, every time a decision is made which influences any program, be it a commitment to expend resources, or a change in anticipated income, the information would be used to update the long range plans and projections of the institution. If the plan is not kept current, it cannot serve a useful purpose in the on-going, day by day, decision making. If the preliminary to supporting a decision must be an updating function, respose delay may negate the value of the support. How might this updating be translated into a working procedure.

1. The procedure will vary with the size of the institution and the formality of its planning activity. If responsibility for long range planning is assigned to one individual, updating is his responsibility.

2. There must be formally established lines of communication so that decisions effecting planning are relayed to the planning activity for interpretation and recording. This communication is most difficult with non-quantified information, items not normally included in operating reports.

3. The planning activity will normally receive all reports on enrollment, finances, and the other statistics necessary to maintain valid long range projections.

4. The compilation of the annual budget is an automatic due date requiring that the long range plan for the next year be ready to translate into an operating budget.

5. If a long range planning committee meets on a fixed schedule, this will trigger the frequency with which updating must occur.

This program budgeting procedure will not produce a hundred page master plan which is approved by the trustees and distributed in two hundred copies. Such a document may be produced as a record of conclusions on a given day. But its updating should be commenced immediately to keep it current and viable. The master plan would better be thought of as a loose leaf notebook whose pages record the most up to date decisions on objectives and goals, data to develop costs and benefits of alternative programs, and long range fiscal projections of selected alternates.

III PROGRAM BUDGETING AND THE INSTITUTION

Program budgeting is designed to provide visibility to the decisions affecting the allocation of resources in the university. Since it will effect both the size of the pie as well as the size of the pieces, its introduction will effect the entire organization. It will require additional effort to gather information in a format not now used. It will take the time of many key people to do the planning. There is no evidence that the level of planning in most colleges and universities is so thorough, that this additional activity will be wasted.

HOW TO GET STARTED-AN ORGANIZATION FOR PLANNING

Centralized planning will normally eminate from the president's office. The president will not normally have the time to organize and coordinate the complete activity. Therefore, one person should be assigned responsibility to organize the activity working with a small steering committee.

The steering committee is a compromise between wide involvement and getting the job done. The steering committee represents the apex of a planning group that could literally include hundreds of people. Members of the governing board, administrators, faculty, students, alumni and the public may participate in a self study, or meet annually to review progress reports. The Fox[9] planning program, involves all faculty at the department level, then representatives, chairmen, deans at subsequent planning levels. These groups meet annually to develop one to three year department plans that can evolve into long range planning projections. The steering committee, augmented from time to time, can meet on a monthly basis, and more frequently when the annual budget, or an annual review is scheduled.

When there is a formal planning staff, such as an Office of Institutional Planning, their relationship to the organization must be carefully structured. Their major activity may be to provide studies when called upon by members of the administration. They might also serve as the staff assistance for the planning steering committee. If this committee is representative of the entire academic community, the staff relationship to the community is established. Even in the smallest institution, some kind of formal organization should be established, staffed by persons with major responsibilities elsewhere. Without formal and periodic reviews, the activity will be so sporadic as to have no real value, and most decisions will continue to be made with little or no supporting information.

A SELF STUDY

When initiating the planning activity, an institutional self study is a reasonable first step. After the first time, the long range planning activity becomes, in effect, a continuous self study. A review of other college and university experiences would be helpful.

Donaldson's[10] report of over forty college and university self studies describes some major concerns about a successful self study. The time to do a self study is a major one. Some schools considered self studies unnecessary because they feel that alert institutions are in a constant process of self evaluation. Others feel that "outsiders," such as trustees, are not capable of making a significant contribution because of their lack of familiarity with educational processes. Another criticism of self studies is that they are basically a criticism of what is being done, and too seldom an effort made to determine what can be done. When a self study is considered an appraisal of what is, and is followed by long-range planning to develop what might be, this problem is eliminated. To minimize the greatest concern, the time lost to the participants, Donaldson recommends the activities that should be undertaken to increase its effectiveness.

1. The studies should be organized on a formal and manageable basis. Unrealistic plans for inquiry will fail and depreciate the entire process.

2. The administration should start the process with a strong statement of the purposes and directions of the planning activity.

3. There must be a strong conviction on the part of the administration and faculty that the self study and planning effort is necessary. Without this transmittible conviction, a "make work" atmosphere may dominate.

4. Considerable preparatory work should be undertaken, including the structuring of the inquiry, the selection of institutional concerns, the establishment of procedures, the development of trustee and alumni interest.

5. A steering committee of four to twenty members should be selected jointly by faculty and administration. Good results came more often when the president did not chair the central

steering committee, but was an encouraging ex officio member.

6. High ranking members of the faculty were usually selected as project directors with release time, clerical help and a special budget.

7. The selection of problem areas to emphasize is dependent upon the current concerns of the institution. The steering committee and director must agree on these problems, the depth of study as a function of time available, and the degree of sophistication of the analysis to be undertaken. For example, extensive questionnaires for students and alumni, did not warrant the time and cost involved.

8. The subcommittees assigned to study particular areas should be selected carefully to create broad participation in the project.

9. Good communications must be maintained with a constant flow of information to participants and bystanders.

10. Deadlines must be established and maintained and the form and method of reporting clearly established.

Budgets for major self study projects ran from $25,000 to $400,000. How much faculty time is charged directly to the study will of course have great impact on this figure. The most valuable results occurred when these funds were used to help faculty members do written work, take part in seminar discussions beyond regular expectations, conduct research and support clerical assistance. Data processing costs will be an increasingly significant expenditure.

Appendix A includes a check list of the topics which might be included in a self study. While some of these items may not be pertinent to a particular institution, most are the common concerns of all of higher education.

COLLEGE AND UNIVERSITY DECISION-MAKING

The term decision-maker is used with reference to those who must make the ultimate choice, select an alternative, rank items in priority, or even vote at a committee meeting. Compared to the more structured organization of business and industry, little is really known about decision making in higher education. In addition, the pattern varies significantly among institutions. The small private school may operate with the president making most of the decisions. The campus of a large state university may operate in a system of higher education, with governing board, coordinating councils, legislators and a central university structure in addition to the local hierarchy.

The decision-making process is a complex interaction involving students, parents, alumni, faculty, administrators, legislators, governors, taxpayers and donors. Each influences different classes of decisions in a different manner. The central authority structure of a corporation lends itself to central planning, with a coordinated plan disseminated to all of the elements of the organization. An employee is not allowed, for example, to pick the color he wants to paint wheels that day. All must operate to an integrated plan. Education, on the other hand, generally operates around a central authority that is concerned with finance and facilities with the programs left to the professionals who are directly involved in the education process. There is still considerable conflict to be resolved about the degree of centralized decision-making. Because of the pressures of costs, the competition for funds, the apparent public disenchantment with higher education, it is possible that colleges and universities will be seeking new methods of controlling their destiny, new methods of making do with what they have. If the concept of the university as a free forum is sustained, in lieu of the university becoming directly involved in social action, program budgeting will lend itself to the rational process the forum would need. Whatever the ultimate power structure, the visibility it provides is available to everyone who would participate in the discussion. Governing boards, legislators, faculty and students will be provided with the same information though they probably will arrive at different conclusions.

RESISTANCE TO IMPLEMENTING PROGRAM BUDGETING

Any new procedure will be met with resistance from those who would prefer the status quo. Program budgeting, since it represents a change in the manner in which resources will be allocated, creates its own special set of adjustments.

1. Methods of insuring internal communication must be established. The various publics, who wish to have their position heard, need an avenue of communication with the decision-makers. The staff who must provide analytical support will need to develop a method of effective continuing exchange.

2. There is a fear that too much time will be required to do program budgeting. It will require the time of persons who are already overloaded. Yet no organization can afford

not to do planning. Methods of communicating information, of preparing and presenting reports, of holding meetings must be developed. If streamlined and focused this support need not be a burden.

3. Most decision-makers in higher education are educated in disciplines where quantification is not commonly utilized. Formal training sessions for all participants may be necessary to develop the full potential of the procedure.

4. There are some decision-makers who will resist formal planning and long range projections because they are afraid their mistakes will be more obvious. With decisions made "off the top of the head," mistakes are more easily rationalized.

5. Those who are winning under the present system, will resist a change particulary when it proposes to hold every program up to the light, and re-establish priorities based on the results.

The adoption of program budgeting will not necessarily reduce confrontation. Wildavsky[11] suggests that it will increase friction because there will be more things to argue about. When evaluating the opposition to implementation of PPBS at the federal level, he suggests a number of reasons.

1. The assumptions used in cost-benefit analysis are open to question. Unless you agree with every step of the analysis, you need not necessarily agree with the conclusions.

2. It is possible that the techniques selected by the analysts are those that are solvable, rather than those which are appropriate to the problem posed. This is particulary true when attempting to model extremely difficult to quantify problems.

3. The burden of calculation excludes some decision makers from the deliberative process because they are unable to provide similar data, or to follow the argument presented in favor of a particular alternative.

4. The outcome of the political process will change if PPBS is used. He questions whether or not it will be an improvement. This suggests the political scientists concern that the present system, with its checks and balances, is more than adequate. Any attempt to substitute quantifiable based presentations, for logical debate, will not necessarily be an improvement.

5. Policy analysis should be the central concern of the top decision-makers. They should not be confused with the budgeting process. Program budgeting tends to confuse the two.

6. Analysis should be concentrated where it will do the most good, not uniformily across the board as program budgeting requires.

Whether or not all of these concerns are valid for colleges and universities is not yet known. The acceptance of any rational decision-making system does center around faculty attitudes. It is possible that faculty will ultimately accept program budgeting if:

1. They truly accept the concept of rational decision-making as the basis for operation of the academic community.

2. If the three tenets of academic freedom proposed by the American Association of University Professors are realized:

   For the common good
   The rights of the faculty to teach
   The rights of the student to learn

3. They are confident that non-economic and cultural values of higher education will be included in the analysis as well as economic ones.

4. That mechanisms will be developed to accommodate reasoned demands with reasoned response and discussion. We do not appear to have developed this ability at this time.

5. There is general recognition that pressures external to the university community will force re-evaluation of what is being accomplished with present resources. The re-evaluation will be more meaningful if it is undertaken by members of the academic community.

6. It is recognized that politics are never eliminated from any system. However, the deliberations can be carried out more effectively with pertinent information, than if they are undertaken in a vacuum.

THE EFFECT OF THE INSTITUTION'S COMPLEXITY

There are two kinds of potential disenfranchisements possible as the result of program budgeting. The first relates to the size of the institution, the second to the lack of familiarity, by most members of the academic community, with this approach to planning.

There is a reasonable chance that smaller institutions will fail to benefit from the visibility program budgeting offers, because they believe it is not possible with their present organization, and they do not feel the activity warrants an expansion of their staff. In the description of the ten step program budgeting procedure, a reference was made to the degrees of sophistication that can be employed at each step. While there is a minimum level of data gathering and analysis necessary in even the smallest organization, there are two major reasons why a more modest approach to program budgeting can be engaged in by smaller institutions.

The first is that its programs are less complex. Most small institutions are liberal arts colleges, with a limited academic offerings and focused primarily on the student, his environment, and his instruction. With a limited number of majors, no graduate work, a single college, a limited program of public service, often no funded research program, there are fewer variables with which to work. As the organization grows larger, its activities grow more complex, and communications more difficult. But the larger organization can also afford to spend more money in its coordination, including the planning activity. The concepts of program budgeting can be employed in institutions of every size. It's involvement can vary with its complexity.

The second advantage the smaller institution has over the larger is that the lines of communication are shorter and involve fewer people. If involvement is to be sustained, the larger institution must have more areas represented, a wider variety of activities investigated - in general a more complex planning organization.

Disenfranchisement from participation in planning because of "the burden of calculation" may be an inappropriate concern for the campus. No one participating in the deliberations will be unable to follow the presentation if they are willing to devote the time to learning the nature of the arguments, and their basis. There are those who say that the "new administrators" must be equally comfortable in the discussion arena and in the technical workshop. It is more realistic to acknowledge that most people won't have time to develop competence in the two arenas, and methods of communication must be developed so that decision-makers can be supported in their assignment by the suppliers of information.

MANAGEMENT INFORMATION SYSTEMS

A management information system is designed to provide information upon which to base decisions which will lead to more effective administration of the university.

An information system includes data collection and storage, translation of data into information, and dissemination of information to those members of the organization who have need for it. The distinction is made between data--raw facts, and information--which is data translated into a useful form. For example, gradepoint averages may be collected for all students. If the students name, and his gradepoint (two data elements) are combined on a list, it becomes information. If gradepoints are combined with class and college identification, and an array developed showing average gradepoint by college and class, data has been translated into information. A data element by itself, generally has little meaning. The systems concept is applied to information processing, because it should be planned considering the entire organization; collection points, how it is collected, in what form, persons who need the information, the best method to get the information to them, and format of presentation. Exhibit 12 is a list of data elements for students. This is information that might ultimately be collected for each student. All other items of data required for the operation of the institution, staff, finance, facilities, are also listed. Hopefully, after a study of systems and procedures, it would be necessary to collect this data only once--at the point where it is most easily obtained. After that, it is available to everyone in the organization who has need for it. When this systems concept is not realized, then some of the information is collected in two or more offices, they each maintain and update their own data file, and data is shared with other offices only with the greatest reluctance. The maintenance of a single, current, student address, is itself a major task. A student's name might be collected only once, when he made his application. This would be the beginning of his data file. Much of the other information shown in Exhibit 12 might be collected from his application form. The remainder builds as he enrolls, takes courses, finishes each year, and eventually graduates. After graduation, his file is augmented by that data normally required of an alumnus. This same data file serves all of the needs of the University from the time of application, until he is removed from the alumni files.

INPUT INFORMATION

- Student number
- Social Security Number
- Name
- Home address
- Area code - Zip
- Parents/guardian's name, address and zip code
- Birth date
- Six code
- Marital status code
- Selective service classification and number
- High school name and address
- High school code and year graduated
- Converted high school grade point
- Previous college name and code
- Previous cumulative hours, credits and grade point average
- Class (year)
- Term code
- Residence code
- College name and code
- Curriculum name and code
- Aptitude and interest test scores
- Degrees at other colleges
- Financial plans--loans, scholarships, work
- Parents' occupations
- Parents' education and degree if alumnus
- Home phone number
- Parents/guardians phone number
- Admission year
- Citizen
- Gross income
- Hometown newspaper
- Marital status of parents
- Admission status codes (fees, data, acceptance early notice, rejected, pending, etc.)
- College testing scores
- Campus address
- Graduate-undergraduate code
- Previous courses, descriptions, grades
- Current courses, descriptions, grades (this term)
- Cumulative hours, credits, Grade point average
- Action codes
- Religious preference code
- Tuition and fees
- Board code
- Scholarship, fellowship, assistantship, loan code, amount
- Organizations and offices, honors
- Name in full (last, first, middle, maiden)
- First name and spouse
- Occupation code
- Degree code
- Fund code
- University status code
- Mailing name
- Mailing address
- Affiliations codes
- VIP code
- year of death
- Salary range code
- Gifts amount
- Pledge amount
- Date payment due
- Frequency of payments
- Pledge balance due amount
- Payments to date amount

Exhibit 12

These files could be kept manually on several cards in a central loaction. Or, as the number of records grows, they might be collected in a manner that would lend to machine sorting. As the number grows even larger, the file may be stored on a computer.

An example of potential use would be the maintenance of individual student files on course planning and accomplishment. The courses a student plans to take, which have been approved by his advisor as acceptable for a degree, are entered into his data file. Each time he completes a course and receives a grade, that course is automatically subtracted from his file by the grade reporting mechanism. At any time, a print-out will show the courses he has yet to take. It would tell when graduation requirements have been met. The plan can be changed in conjunction with his advisor at any time. The courses he has completed and their grades is the basis for his grade transcript. Some institutions are no longer making a "hard copy" of the student grade record. Each time a transcript is requested, it is printed out from the information stored in the students data file on the computer. What we have described is an inter-relation to meet all of the needs of the institution.

When the information system is sufficiently comprehensive so that it can support the functions of planning, implementing, controlling and evaluating, it becomes a management information system. Since these functions are intrinsic to the program budgeting procedure, it is apparent that program budgeting will only be as effective as the information which is available to it.

The major current activity focusing on these problems, is the WICHE Management Information Systems Program. Originally planned by the western states that make up the commission, it has now been expanded to include institutions throughout the United States. It proposes in summary:

> To design, develop, and encourage the implementation of management information systems and data bases including common data elements in institutions and agencies of higher education that will:
>
> Provide improved information to higher education administrators at all levels.
> Facilitate exchange of comparable data among institutions.
> Facilitate reporting of comparable information at the state and national levels.[12]

Within an institution, one of the prime targets of an information system is to provide the data that is used in testing a model of the institution--the long range projections. As part of its MIS project, WICHE is developing a relatively elaborate model which hopefully will be readily converted to the needs of individual institutions. Again, the needs of the large and the smaller institution should be distinguished:

1. Those schools who do not have complex computer based information collection systems are not eliminated from using program planning.

2. The point of diminishing returns has not yet been calculated for these kinds of systems. They are currently being advanced as providing information more quickly, in greater quantity, and to make possible analysis which cannot be undertaken manually. The impact of "better decisions" has not yet been identified and measured--benefit analysis and program evaluation have yet to be performed.

3. The most critical gap in the management information systems development to date, is the identification of the kinds of decisions being made by administrators which could benefit from increased information. One project, Stanford's INFO, recognizing the difficulty of identifying all needs ahead of time, is therefore collecting all information about the university that might be helpful to administrators and making it available on individual computer terminals. Each administrator can inquire directly into the data. A record of these inquiries will provide a very informative pattern for future information systems designers.

The institution embarking on the development of a system to support its activities, including planning, should remain aware of these developments. Exhibit 13 lists some of the decision supporting information included in the WICHE MIS project design. This will be expanded as the project develops.

POLICIES AND PROCEDURES

Most colleges and universities attempt to develop information systems before their operating procedures are reviewed and standardized. This is quickly apparent when systems using computers are being developed. A major effort in computer based systems is programming and debugging a program--making

DATA REQUIREMENTS FOR MANAGEMENT DECISIONS

1) Data on Input
2) Data on Output
3) Data Relating Input to Output
    - The Cost Per Student Per Year in Particular Fields of Study
    - The Cost Per Degree in Particular Fields of Study
    - The Cost of Adding Students to a Particular Field of Study
    - The Cost of Programs at Particular Levels of Quality
    - The Cost of Expanding Existing Programs or Institutions
    - The Cost of Establishing New Programs or Institutions
    - Beneficial Side Effects on the Institution Itself
    - Relationships Between Inputs and Their Associated Costs and Outputs and Their Associated Benefits
    - Relationships Between Costs and Sources of Funding
    - Values Added to the Student, Knowledge, and Public Service

Source: Western Interstate Commission on Higher Education, Management Information Systems Program

Exhibit 13

it work so that the desired results will be produced. Once it works as intended, the true value of the computer is available--high speed data manipulation. If the procedure is then changed--a new input form, a different kind of report--the program must be rewritten, debugged, and again brought into working condition. If procedures are standardized, and the computer programming done only once, the economies computers promise can be realized. Procedures that are frequently changed are a primary reason why universities do not achieve the savings they anticipated. Their previous experience is misleading, for it is relativel simple to manipulate a manual system. New forms are designed, and the persons using the system are trained in its use. An apparently simple change in a machine system may require many man-hours to rewrite the program. Therefore, when a new system is being implemented, and implementing program budgeting will require changes, all phases of the system should be reviewed to insure:

1. That standard procedures are agreed upon before any changes are made to insure that all the people who will collect data, and all the people who will use information know and understand what they must supply and what they will receive.

2. These procedures should be written,and the form in which the information they seek, should be displayed. Many times requests for information will be processed through the information system at great costs, and when the information is received, it is not what the user visualized. Then it starts all over again, a revised program, forms change, trial runs, etc.

3. The preparation of standard procedures, standard practices, policies and procedures, or whichever title is used, is not of value just to the development of a management information system. Collected in a loose-leaf manual, for easy revision, it is also a record for new employees of how to get things accomplished: where to start, what forms to use, who gets which copies, etc.

4. Too often, time is not taken to standardize procedures. It is thought that the analysis is too expensive. The hidden costs are rarely recorded. All of the work that is done over. The phone calls to find out how to order furniture. The long break-in period for new employees. These mistakes are just some of the costs of moving ahead without planning, review of what is wanted and needed, and the best way to achieve both.

AN OFFICE OF INSTITUTIONAL PLANNING

Program budgeting seeks to provide visibility to the decision making process. It does this by developing information about alternates--resource requirements and the benefits anticipated. If this kind of cost-benefit analysis is not being done at present, it will require the additional time for someone to develop this information. Increasingly this is being done by a staff group concerned with doing research about the university. The Office of Institutional Research, Institutional Planning, or Analytical Studies, are titles frequently used.

This is a relatively new campus activity. While a limited number of schools have been engaged in introspective studies for many years, most universities have developed formal staff activity only in the last ten years. These offices relate to program budgeting because much of the cost data needed to calculate resource requirements is available from existing fiscal records. The measurement of outputs and benefits is just beginning. This is where additional research is needed to bring them both together. The Institutional Research Directors of the Great Lakes College Association have developed a statement of this function in liberal arts colleges:

1. The primary function of Institutional Research is to generate, organize, analyze, and maintain information useful in the definition of the basic nature of the institution and in its planning and decision-making processes. IR is designed to assist, not supplant, existing areas of responsibility in both the academic and administrative functions.

2. The Institutional Research office should have broad responsibility to the entire campus community. For this reason, the IR office at most colleges reports directly to the Chief Academic Officer or to the President.

3. Institutional Research should serve the principal faculty and administrative planning groups. It should provide and interpret available information and design needed studies to gather additional data. In this way, IR renders maximum coordinated research service.

4. The Institutional Research office should encourage other campus agencies to maintain standardized tabulations of basic information. This allows appropriate coverage for all campus oriented research and reports.

5. Institutional Research should actively involve administrative staff and faculty in planning and conducting IR studies. Such involvement will facilitate communication and further utilization of IR services.

6. Institutional Research, as a professional service, should provide written and oral interpretation of studies to the sponsoring group or individual. Periodic reports to the entire college may also prove effective and often stimulate community involvement.

This same office might have its functions broadened to include the additional functions, which need to be brought together in a true "systems" fashion so that the institution operates as a unified whole. These might include:

1. The budgeting function including the preparation of the annual budget. Then it would move to the controller as an authorization and control document. This may be the only way the non-economic factors will receive equal hearing with the financial factors, particularly in the eyes of the faculty.

2. Procedures. Present university organizations do not seem to contribute to unification of data collection and dissemination. These are not exclusively machine data processing procedures since some should remain in a manual mode.

At a time when all colleges and universities are faced with increasing costs, when there is criticism from without that there has not been a comparable increase in productivity, when the costs of central administration are rising more quickly than those of the instructional function, it is difficult to think of adding still another staff group. Yet, more effective utilization of resources can be achieved only if some people take this as their special concern. This is the dimension which an institutional research activity can add--providing that it can be integrated into the organization, and that its efforts support the rational decision making as described by the program budgeting procedure.

IV MODELING AND SIMULATION

An operations planning model of a university is a mathematical description of the interaction of all of the various elements of the university. It is a mathematical model because the relationships are quantified. To illustrate how a model is developed and used, an imaginary university will be described. First, the procedure used in "building" the model will be discussed, then a number of potential decision alternates will be tested to illustrate how the model can be used in decision-making.

The model for Nedrap University is relatively simple one but illustrative of the procedure. It is a partial model in that it does not include the relationship between enrollment, program facility requirements, new capital needs, and increased costs of physical maintenance. The data used in the model and the result of one combination of values, are shown in Exhibits 14, 15 and 16. In these exhibits each item is numbered to aid in identification as they are described. A model can be written down on a piece of paper and values computed by hand on a desk calculator, or it can be programmed for a computer. The computer program is a set of instructions telling the computer when to add, multiply, print, etc. Exhibits 14, 15, and 16 are the computer "print-out" for the Nedrap University Model.

These projections were extended eight years only so that the computer print-out would match this publication size. Five, ten or even twenty years could be used.

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                    EIGHT YEAR FINANCIAL PROJECTION  1969-1976     NEDRAP UNIVERSITY

          RUN NUMBER    100.          6./ 8./   1970.ROBERT J. PARDEN

                                        ENROLLMENT PROJECTIONS
                             1968-69 1969-70  1970-71 1971-72 1972-73 1973-74 1974-75 1975-76

1) UG ENROLLMENT               2900.   3059.   3227.   3405.   3592.   3790.   3998.   4218.
2) LAW ENROLL                   264.    269.    274.    280.    285.    291.    297.    303.
3) GRAD ARTS                     92.     96.    101.    106.    111.    117.    123.    129.
4) GRAD BUS                     586.    597.    609.    621.    634.    646.    659.    673.
5) GRAD ENGR                    307.    313.    319.    325.    332.    338.    345.    352.
6)      TOTAL REGULAR FTE      4149.   4336.   4532.   4739.   4956.   5185.   5424.   5677.

7) EXTENSION                    120.    126.    132.    138.    145.    153.    160.    168.
8) SUMMER SCH                  1458.   1458.   1458.   1458.   1458.   1458.   1458.   1458.
9) MGT CENTER                    27.     27.     27.     27.     27.     27.     27.     27.
0)      ENROLL-TOTAL           5754.   5947.   6150.   6363.   6587.   6823.   7070.   7330.

1)     ENROLLMENT FACTORS      FTE        FTE GF     TUITION ADJ FACTR
2) UNDERGRADUATES             2900.       1.0550       0.9880        20) PERCENT PROFS         0.2100
3) LAW                         264.       1.0200       0.8300        21) PERCENT ASSOC         0.1800
4) GRAD ARTS                    92.       1.0500       0.5200        22) PERCENT ASSISTANTS    0.4700
5) GRAD BUSINESS               586.       1.0200       0.4600        23) PERCENT INSTRUCTORS   0.0400
6) GRAD ENGINEER               307.       1.0200       0.6320        24) PERCENT LECTURERS     0.0700
7) EXTENSION                   120.       1.0500       0.2470        25) PERCENT OTHER RANKS   0.0300
8) SUMMER SCHOOL              1458.       1.0000       0.0810
9) MGT CENTER                   27.       1.0000       1.7600

                    DATA USED IN PROJECTIONS
6)      RES AND GRANT OVERHEAD RATE           0.4200
7)      TUITION RATE   INCREASE               1.0900
8)      STUDENT FACULTY RATIO                15.5000
9)      STUD-FAC RATIO GF                     1.0000
0)      FAC SALARY GROWTH RATE                1.0700
1)      COMPENSATION PERCENT                  0.0900
2)      COMPENSATION GROWTH RATE              1.0020
3)      INSTR SUPPORT GF                      1.1030
4)      INSTRUCTIONAL SUPPORT PER FTEF     3315.0004
5)      INIT SS, EXT,MGT C,ROTC EXP      185000.0316
6)      SS,EXT MC RO GFACTOR                  1.0600
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PAGE 2   KEY VALUES PROJECTED     RUN NUMBER     100.          6./ 8./1970.

                        1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76

37) NO.PROF                 56.       58.       61.       64.       67.       70.       73.       76.
38) NO.ASSOC                48.       50.       52.       55.       57.       60.       62.       65.
39) NO.ASST.               125.      131.      137.      143.      150.      157.      164.      172.
40) NO.INSTR.               10.       11.       11.       12.       12.       13.       13.       14.
41) NO.LECT.                18.       19.       20.       21.       22.       23.       24.       25.
42) OTHER FACULTY            8.        8.        8.        9.        9.       10.       10.       10.

43) AVG SAL PROF         15380.    16456.    17608.    18841.    20160.    21571.    23081.    24696.
44) AVG SAL ASSOC        12637.    13521.    14468.    15480.    16564.    17724.    18964.    20292.
45) AVG SAL ASST          9984.    10682.    11430.    12230.    13086.    14003.    14983.    16032.
46) AVG SAL INSTR         8307.     8888.     9510.    10176.    10888.    11650.    12466.    13339.
47) AVG SAL LECT         21000.    22470.    24042.    25725.    27526.    29453.    31515.    33721.
48) AVG SAL OTHER        10000.    10700.    11448.    12250.    13107.    14025.    15007.    16057.
49) ENROLLMEN-REGULAR     4149.     4336.     4532.     4739.     4956.     5185.     5424.     5677.

50) TUITION RATE          1725.     1880.     2049.     2233.     2434.     2654.     2892.     3153.
51) FTE FACULTY            267.      279.      292.      305.      319.      334.      349.      366.
52) STUD-FAC RATIO      15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000
53) TOTAL FAC SAL      3292221.  3681650.  4118066.  4607230.  5155618.  5770512.  6460099.  7233587.
54) TOTAL COMP          296892.   332011.   371367.   415479.   464933.   520384.   582571.   652324.
55) INSTR SUPPORT       978747.  1022917.  1069319.  1118073.  1169304.  1223143.  1279730.  1339212.
56) SS,MGTC,EXT,EXP     185000.   196100.   207865.   220337.   233558.   247571.   262425.   278171.
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PAGE THREE     OPERATING BUDGET   RUN NUMBER    100.            6./ 8./1970.

    ACCOUNT      GROWTH F     1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
57) TUITION                  6700347.  7640733.  8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
58) ENDOWMENT       1.0580    776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
59) GEN AND DEPT 1.0500       140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
60) AUX ENTRP       1.0500   2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
61) GIFT            1.0500   1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
62) ORG ACTVT       1.0450    194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
63) RES AND GRTS 1.0000       911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
64) FINANCE AID     1.1000   1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
65)      TOTAL INCOME       14128848. 15457132. 16944984. 18613652. 20487348. 22593712. 24964264. 27634996.


                                                EXPENSE
66) INSTRUCTION              4752861.  5232678.  5766618.  6361121.  7023413.  7761611.  8584826.  9503294.
67) GEN ADM EXP     1.1030    456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
68) GEN INSTUT      1.1030    840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
69) AUX ENTRP       1.0500   2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
70) RES AND GRTS              528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
71) PUBLC SERVCE 1.1030       420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
72) STUDNT SERV     1.1030    599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
73) LIBRARIES       1.0820    534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
74) PHYS PLANT      1.0820   1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
75) ORG ACTIVITY 1.0700       265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
76) FINAN.    AID 1.1450     1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
77) CONTINGENCY   0.0200      277034.   302319.   330324.   361366.   395802.   434033.   476509.   523737.
78)     TOTAL EXPENSE       14128762. 15418306. 16846556. 18429708. 20185944. 22135712. 24301980. 26710592.

79) BALANCE                       86.    38826.    98428.   183944.   301404.   458000.   662284.   924404.
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Sequential run numbers are assigned so that successive trials can be identified. A trial involves changing one or more data values.

DESCRIPTION OF THE NEDRAP UNIVERSITY MODEL

The year 1968-69 was chosen as the base year because an audit for that year was available and "real" data could be used. An earlier year might also be used, particularly if it represented a normal time perhaps before a dramatic change in expenses or revenue occurred. A method for synthesizing a base year will be discussed in the section entitled fixed and variable costs. Referring to Exhibit 14:

Lines 1 through 6	A record of the full time equivalent enrollment in five different programs. These are separated because the tuition charge is not the same for each program and different growth rates might be expected. The calculation to obtain these enrollment projections, starts with an initial enrollment which is then multiplied by a "growth factor." A growth factor of 1.0 means no change. A factor of .97 would create a decline, 1.05 an increase of 5% a year in the projection. Throughout this model, growth factors are used to change the rate of increase (or decrease) anticipated. This model does not adjust physical plant costs to accommodate major changes in enrollment and facility requirements.
Lines 7 through 10	These are special programs whose enrollment affects income and expense, but are not taught by full time faculty as part of their regular teaching loads. A separate expense category is used.

Lines 11 through 19	Enrollment factors for each program. FTE is Full-Time Equivalent students for the base year. FTE GF are the growth factors used in enrollment projections. Tuition adj. factor is used so that it would be unnecessary to insert a different tuition rate for each program, and so that fall enrollments could be used in projections (without averaging winter and spring terms.) The adjustment factor was computed from historical data. For example: Fall enrollment multiplied by the undergraduate tuition rate multiplied by the tuition adjustment factor equals the average tuition income per quarter. This computation, therefore, adjusts for the drop off in winter and spring enrollments, and the difference in unit charges among programs. If the undergraduate tuition is raised, it is assumed that all others will be raised proportionately.
Lines 20 through 25	The percent of faculty in each rank is critical. Faculty salaries will increase in response to merit increases, inflation, and for those who get promoted. The data in the example is not typical, since it includes a great number of part-time faculty whose full time expense equivalence is evasive.
Line 26	Income for grants and contracts is calculated to be project costs plus the overhead rate multiplied by project costs. This rate will normally be less than the audited rate since

	some grants do not carry an overhead allowance.
Line 27	The annual rate of increase of undergraduate tuition is stated as a percent. The program could be written to accommodate a dollar increment each year.
Line 28	The student-faculty ratio: the comparison of full-time equivalent students to full-time equivalent faculty. This is a difficult computation with part-time students, for the full-time equivalency of part-time persons in each category is an arbitrary figure. It may be necessary to calculate a ratio which will generate the expenses which are actually experienced, or divide tuition income by the tuition rate to obtain an equivalency based on tuition rather than credit hours.
Line 29	The student-faculty ratio can be increased or decreased by this growth factor.
Line 30	The annual rate of increase of faculty salaries.
Line 31	Fringe benefits as a percent of faculty salaries.
Line 32	The fringe benefits rate modified by a growth factor.
Line 33	Instructional support growth rate. A modifier of line 34.

Line 34	Instructional support per full-time faculty member represents the college or school instructional costs other than faculty salaries and fringe benefits assumed to be related to the number of faculty. This could be developed as a percent of salaries or a function of enrollments.
Line 35	This is the income of the summer school, extension, management center and other programs not included in the regular instructional programs. This includes no regular full-time faculty renumeration since all are on nine month appointments.
Line 36	A growth factor applied to the expense recorded in line 35.
Line 37 through 42	This is a display of the actual number of faculty in each rank, computed from the number of students, student-faculty ratio (which gives the number of full-time faculty,) and then the percent in each rank. These values will have to be changed to reflect any anticipated future change in the pattern. Growth factors were not programmed for these values though they could be easily added so that they could be changed for the future and always add up to 100%.
Lines 43 through 48	The average salary paid in each of the ranks. The salary of a lecturer in this example, is abnormally high to accommodate the total

part-time instruction salary budget. This could be refined in a more precise model.

Line 49	The regular full-time equivalent enrollment is the basis for computing full-time faculty. It does not include summer school, extension or other special program faculty.
Line 50	The annual undergraduate tuition rate is based on the 1968-69 rate modified by the tuition rate increase (line 27).
Line 51	Full-time faculty calculated from full-time students (line 6) and student-faculty ratio (line 52).
Line 52	Student-faculty ratio, (line 28) modified by growth factor (line 29).
Line 53	Total faculty salaries equals the number of faculty in each rank multiplied by their average salary (lines 43 through 48).
Line 54	Total fringe benefits equals total salaries (line 53) multiplied by fringe benefit rate (line 31).
Line 55	Full-time equivalent faculty (line 51) multiplied by average support per faculty member (line 34).
Line 56	Summer school, extension, management program expense which is not part of the regular

faculty-salary-department expense.

THE INCOME ACCOUNTS

Line 57	Tuition is computed from tuition rate and enrollment (lines 12 through 19).
Lines 58 through 64	These are the selected base year values for 1968-69 modified by the estimated change (growth factors in the second column) anticipated for the future.
Line 65	The total of lines 57 through 64.

THE EXPENSE ACCOUNTS

Line 66	The total of salaries (line 53) compensation, (line 54) instructional support (line 55) and special program expense (line 56).
Lines 67 through 76	The traditional expense categories modified by the anticipated growth factor: 1.0 with no change, less than 1.0 for a decrease, greater than 1.0 for an increase.
Line 77	The selected contingency factor allows a contingency fund for the unexpected. It can be set to zero.
Line 78	The total of lines 66 through 77.
Line 79	The difference between line 65 and 79.

The true test of a model is to use historical data from the first of two years for which historical data is available. Predict the income and expenses for the second historical year and see how closely the model and the actual data compare. If the error is too great to be accepted as a planning figure, then a different predictive relationship will have to be developed for the items in question. This "testing" is a necessary step in developing a model which will reflect the particular institution.

THE SOPHISTICATION OF THE NEDRAP MODEL

If the Nedrap model were to be used to represent your own institution, you might determine that it did not generate information with sufficient precision to satisfy your needs. It lacks the precision to translate immediately into an annual operating budget. It might therefore serve only as a gross planning tool, or as a training device. It can serve very well in either role at the present level of adoption of simulation, as a planning aid, in most colleges and universities. Currently, a lack of familiarity with this planning technique will probably restrict its use, rather than the lack of precision of the model.

This model does include the major factors that influence the annual operating budget. If a university strategy can be developed with these measures, budget precision can be developed in the translation process, or a more precise model can be developed.

A few of the calculations that could be added to give greater precision:

1. A capital budget would reflect capital expenditures over the next ten years to provide additional facilities. It is questionable if this is worth simulating. The expenses will not be linear. The source of funds varies (appropriations, gifts, grants, financed through bonds) by projects. To the degree that the capital budget effects annual operating budgets, it could be added to the model program on an annual basis, by using appropriate growth factor for physical plant.

2. An enrollment model could be developed in which enrollment projections were made as population changes were anticipated, and as interest in various programs fluctuated. This could probably be handled more easily as a separate predictive enrollment model with the results fed into the university model.

3. Each of the activities in auxilary enterprises could be modeled. What is the surplus in the bookstore as a function of changes in enrollment. The data used in the Nedrap model assumes the same growth rate for income and expenses so that the surplus remains relatively the same.

4. Those institutions with large part-time enrollments (whose demands on the other areas such as student services are not the same as full-time students,) or significant part-time instruction (faculty or teaching assistants,) might wish to refine this calculation since faculty salaries are a significant expenditure.

PLANNING VALUES FOR MAJOR PROGRAMS

While the Nedrap model may not produce the desired precision to generate an annual budget by accounts, it is extremely valuable for testing alternate university strategies. Until more sophisticated program budgeting procedures become commonplace in the decision-making stream, it may not be possible to compare each and every program alternate with all other possible use of those resources. It may be possible to reduce the focus on alternates to a more restricted scope, a department, or a major program, and then let the person responsible for that area choose the best priority of use of the resources for which he is responsible.

For overall strategy, it is necessary to consider how resources would be allocated to the major programs (instruction, general institutional, library, physical plant, etc.) For example, the proportion of resources allocated to general administration have been increasing in recent years relative to those for instruction in many colleges and universities. As graduate enrollments climb, the research allocation increases. If one thinks of these program allocations as allowable expenses, rather than as response to needs (which are unlimited) then a balance between income, and those activities which the institution can afford to undertake, can be maintained at the major program level. Given a specific amount to spend, it is highly possible that each area can better assist in the ranking of programs by listing their recommendations on allocation within the major program constraints. How does this differ from the current procedures. The resource implications of each program are still displayed, benefits identified, so that the reason for expenditures are visible. Establishing the general boundries--the support of the major programs--may assist in blocking out how resources will be used.

The Nedrap simulation includes a contingency account. This is rarely budgeted in colleges and universities. Instead, each level tries to maintain "soft" accounts from which funds can be transferred when an emergency arises. It is much more realistic to recognize that opportunities will arise, accidents take place, that cannot be anticipated. These should be budgeted for. This will also take care of the accounts that are overdrawn by $35 in June and for which many papers must be initiated to "get even" by the end of the fiscal year. It is possible to arbitrarily reduce each program's tentative budget by 2, 3 or 5% and place it in contingency available to that unit. This serves the needs, overdrafts, emergencies, but above all, provides some "seed" money for innovation, an activity conventional budgeting procedures inhibits.

INITIAL VALUES FOR THE MODEL

The Nedrap model was developed on the premise that you start with a given year and plan ahead from there. This is a traditional premise based on the assumption that you never go back, no program is ever discontinued, all you can affect are future allocations. This "historical data" method has the disadvantage of "locking in" all of the decisions that were made during the last few years. The discussion that follows is based on the concept that historical data should be reviewed, "reasonable or goal" values selected for the base or original year, then projections made from there. If a program projection is below its actual funding, then its rate of expenditure can be reduced over a two or three year period until it is in line. This is, of course, easiest to do in periods of inflation and enrollment increases. If the institution is in an unacceptable deficit situation, the adjustments will have to be made more quickly.

While there is always concern for those programs which appear to be absorbing a disproportionate share of available resources, the under supported program, financially comforting as it might be, could create serious problems at a later time. Preventive maintenance is a classical example. "Starved" activities, too must be considered. After selecting the values for the base year, projections from those values are then based on an anticipated rate of increase (or decrease) expected in the years to come. Not all income or expense would be expected to change at the same rate. How they change, and the value selected for the base year requires a knowledge of the nature of the expenses, and how they might be expected to change relative to changes in time, or changes in enrollment. This analysis-the effect of changes in enrollment on income and expenses requires identification of fixed and variable expenses, and can be used to compute a breakeven (no loss) point for the institution.

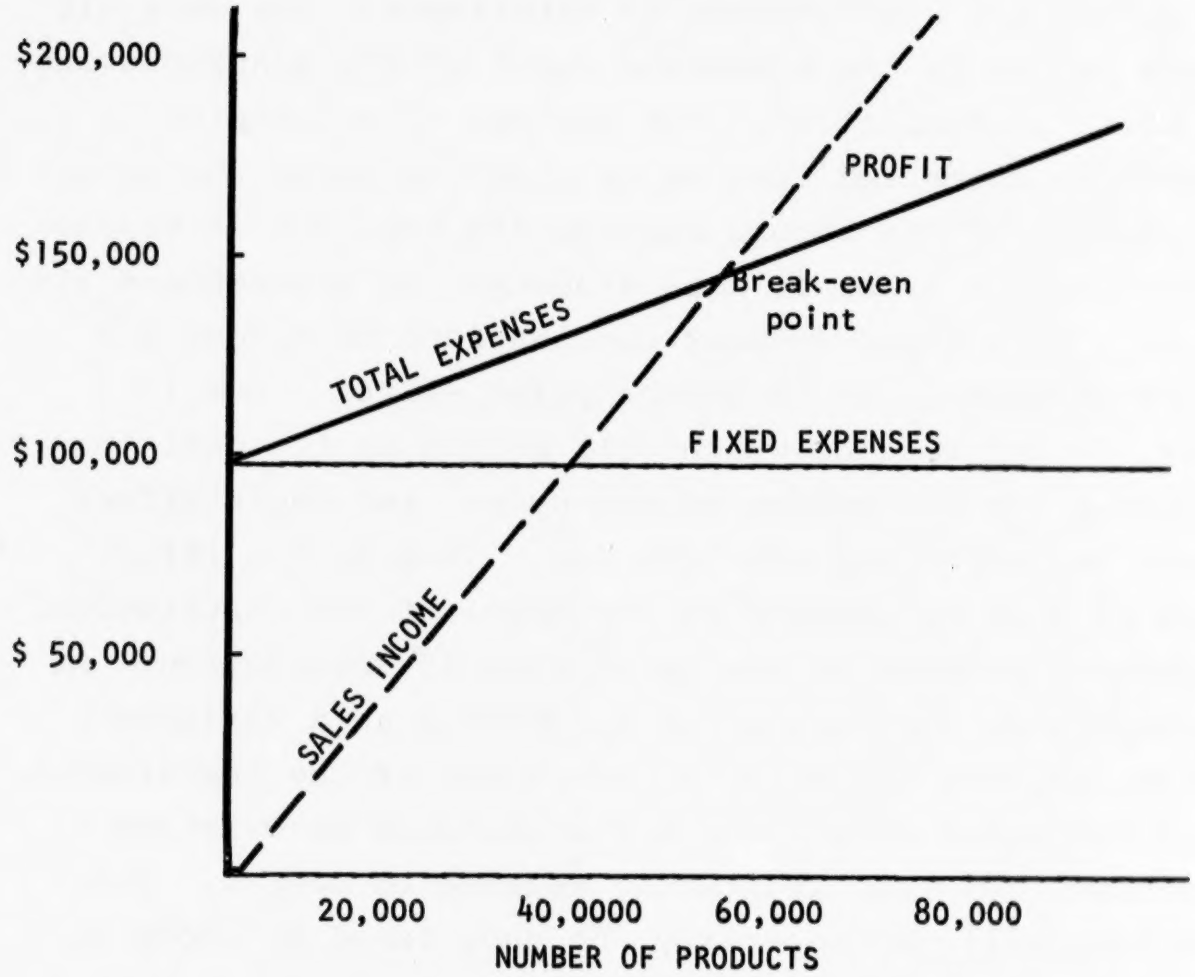
FIXED AND VARIABLE COSTS AND EXPENSES, AND BREAKEVEN ANALYSIS

Breakeven analysis was developed to assist in the analysis of manufacturing enterprises to determine the effect, on profit, of different levels of production and sales. Profit is affected, because, as the activity level increases, fixed expenses are absorbed by a greater number of units manufactured and sold. The cost of manufacturing each item therefore, decreases, and the profit for each item and the total profit increases. That point at which costs and income are equal is the "breakeven" point. This relationship is portrayed in Exhibit 17. The entire premise of mass production is the achievement of higher levels of activity to reduce the unit cost of each item. Should not this same premise hold true for institutions of higher learning. What is the nature of the economies to be realized as enrollment increases. How can we expect the individual accounts to vary in the future.

To pursue this analysis, it is necessary to identify how each income and expense item will vary with changes in enrollment. Those fixed expenses which do not vary directly with changes in level of enrollment will include such items as the expenses of the president's office, fire insurance on buildings, the cost of mowing lawns. They will, of course, be affected if the enrollment changes are significant, and the character of the institution is basically changed. Recognition of a change in structure of the institution in contrast to increasing the utilization of the present structure is an integral part of the analysis. The major expense which varies directly with an enrollment increase, is classroom instruction. Increases in enrollment of as few as fifteen students will require another faculty member if a specific student-faculty ratio is to be maintained.

Income likewise is affected by changes in the enrollment level. Higher enrollments mean additional tuition income for the private school, increased per-student appropriations for the public institution. The fixed income of most institutions is the income from endowment, which changes

A BREAK-EVEN CHART FOR A MANUFACTURING FIRM



LEGEND: The fixed expense at $100,000 is represented by a horizontal line.

Variable Expense of $1 per unit is represented as an addition to fixed expense with a value of 0 at 0 units output, and adding $1 for each unit produced. Their total is shown as a total expense line.

Sales income is generated at $3 per unit providing a sales income (dashed line).

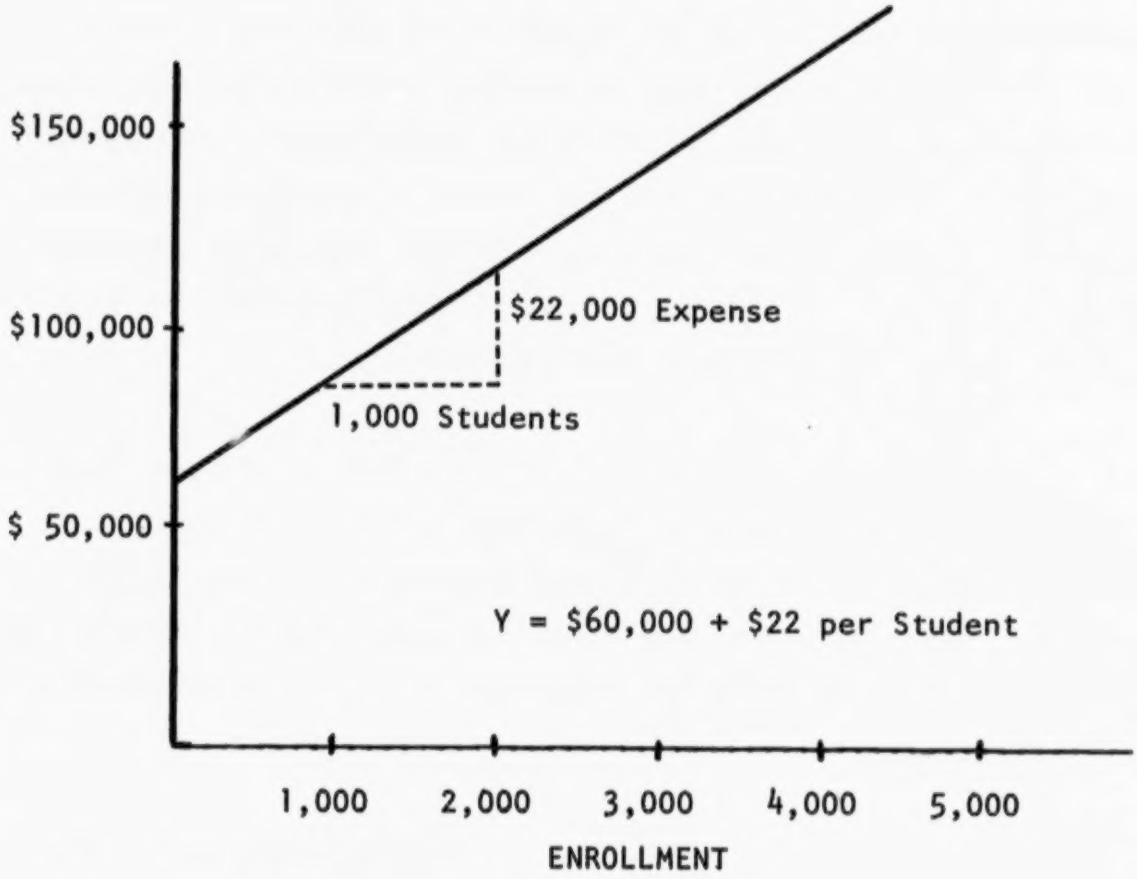
Up to the breakeven point income for sales is less than expenses. Beyond it exceeds expenses.

Exhibit 17

with gifts, not with changes in enrollment. How does all of this relate to the breakeven chart of the manufacturing firm shown in Exhibit 17. The college or university attempts to reach and stay at or slightly above the breakeven point. If its income exceeds its expenses it expands its services -- takes in more students, or strengthens its library. With these various combinations of income and expense elements, its breakeven point shifts. How it shifts, is information which will assist in the decisions concerning the allocation of resources, and their effect in both the short and the long run. This is the information we plan to include in the model of the institution. The central purpose of the university is instruction. As a consequence, instruction is classified as a variable expense, related directly to the output of the institution. All of the other activities are classified as overhead -- supportive, but only indirectly related to output. This assumption will, of necessity, be questioned by those who feel that the environment, not instruction is increasingly the name of the game. All of this is leading to the premise that expenditures in all university accounts need not necessarily increase as enrollment increases. To apply breakeven analysis to a college or university, it is first necessary to classify all income and expense by their variability in respect to changes in enrollment. This is most easily accomplished by plotting historical changes in each category as a function of changes in enrollment.

Exhibit 18 is an example of the method by which historical data is resolved into fixed and variable components. It can be seen that this expense -- organized student activities -- follows a semi-variable expense pattern. At

ORGANIZED ACTIVITIES



YEAR	EXPENSE	ENROLLMENT
1963-64	$111,858	2,435
1964-65	125,279	2,961
1965-66	121,632	3,398
1966-67	133,037	3,563
1967-68	154,883	4,000

Exhibit 18

zero enrollment, there is an expense of $60,000. This might be the salaries of the coaching staff, who are then able to coach all of the activities undertaken throughout an enrollment increase of two or three thousand students. In addition, there is an expense of $11 for each student enrolled, supplies, equipment, part-time coaches -- the additional costs of an expanded program.

Exhibit 19 is a more classical pattern for colleges and universities. This example uses the libraries data. There is no indication of a fixed expense during these five years. Not only is the total expenditure increasing with enrollment, the rate of expenditure per each student is also increasing.

Year	Enrollment	Total Library Expense	Library Expenditure per Student Enrolled
1963-4	2345	$205,537	$ 84
1964-5	2961	$280,985	$ 95
1965-6	3398	$301,662	$ 89
1966-7	3563	$409,844	$114
1967-8	4000	$417,866	$104

It can be seen that the rate of expenditure is increasing as well as the enrollment. Remember that if this expense were fixed at the 1963-4 level of $205,537, the expenditure per student in 1967 with an enrollment of 4000 would have dropped to $51. This would have been the "economy of scale" enjoyed by the organization that increased its output and absorbed the fixed overhead with a greater number of units. This suggests a reason why colleges and universities do not necessarily improve their financial position through

LIBRARY EXPENSE
1963-1968

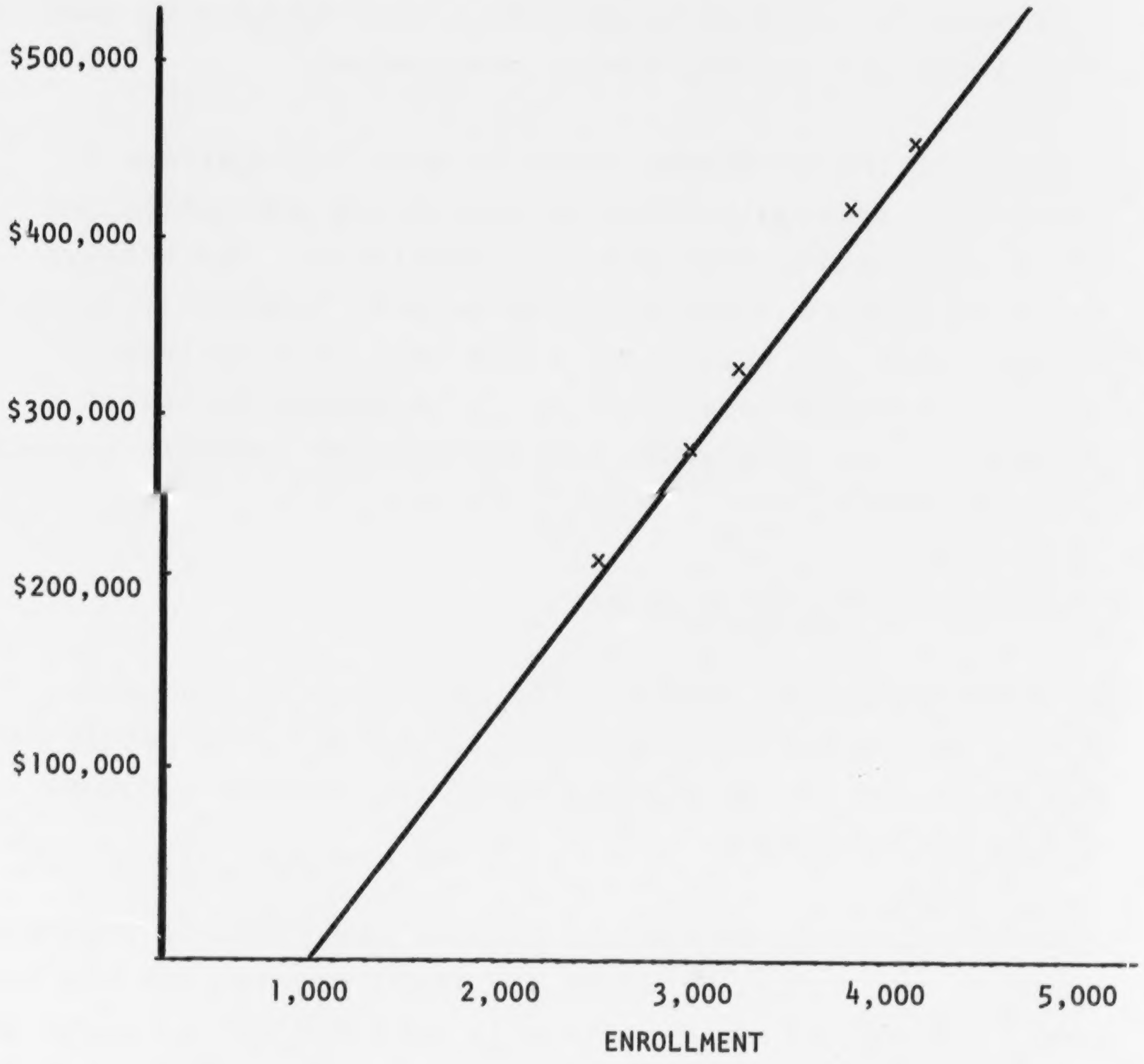


Exhibit 19

expansion. Why does this happen. A new tuition level may be decided upon rather arbitrarily. Then the money now available is assigned to whichever area appears to need it. The library,of course, always needs more.

Every year the breakeven point in most institutions is reached by raising tuition or increasing appropriations and then spending what money is available. The concern for most private schools should be what happens if tuition is increased and enrollment falls off! How is this analysis used in modeling. It is necessary to select values for the base year, and the rate of increase expected for the future.

To develop data for a model:

1. The historical data for the last five to ten years should be plotted as in Exhibit 18 and 19. The nature of the fixed and variable portions of the expense accounts should be identified.

2. This data can be used to project the resource requirements in the future by using the fixed portion for the base year, and the variable portion is included in the model as a cost per student, or as a function of time (inflation,) or both, or related to whatever other casuality that can be identified (number of faculty perhaps.)

3. It is not necessary to use historical data blindly. The difference between real increases in need for resources, and the demand for more resources because there are funds available, is a difficult, but necessary distinction.

4. This failure to identify fixed and variable costs may be one of the major contributors to quadrupled costs while enrollment doubled. It is also one of the major reasons why so many institutions encounter financial difficulty. Their enrollment is too low to absorb fixed costs, they have let costs that could remain fixed, increase with time and enrollment.

COMPARISON WITH OTHER INSTITUTIONS

The review of historical data from any institution raises a question of whether or not a particular pattern is good or bad. What are other institutions doing. What is their pattern. Because each institution has a style of its own, it is not possible to duplicate another pattern and be certain the same results will occur. This is true with the use of any "standards" applied to any analysis. How comparable are the two situations being compared.

Exhibit 20 is the distribution of income and expenses by full-time equivalent students in six categories of independent California colleges and universities. These six categories include:

I Large complex Universities with graduate programs in many areas
II Middle size Universities, predominately undergraduate
III Liberal Arts Colleges with high tuition rates, national visibility
IV Liberal Arts Colleges, with medium tuition rates, regional visibility
V Liberal Arts Colleges-relatively small enrollments
VI Specialized institutions in arts, languages, technology

INCOME AND EXPENSE PER FULL TIME EQUIVALENT STUDENT FOR SIX CATEGORIES OF INDEPENDENT CALIFORNIA COLLEGES AND UNIVERSITIES

1968-69

	INSTITUTIONAL CATEGORIES					
	I	II	III	IV	V	VI
INCOME						
Tuition & Fees	$1,913	$1,523	$1,779	$1,313	$1,210	$ 997
Gifts & Grants	972	434	496	445	455	105
Investment	499	69	416	12	144	17
Other	1,526	149	130	216	277	37
TOTAL INCOME	4,910	2,175	2,821	1,986	1,903	1,156
EXPENSE						
Admin. & General	701	651	753	622	629	398
Instruction	2,759	956	1,248	922	653	513
Library & Plant	686	348	475	274	242	143
Student Aid	719	228	301	189	149	39
	4,865	2,183	2,777	2,007	1,673	1,093
INCOME LESS EXPENSE	$ 45	($ 8)	$ 44	($ 21)	$ 230	$ 63

Source: 1970 Statistical Profile, Independent California Colleges and Universities: A Report to the Joint Committee on Higher Education, California State Legislature, The Association of Independent California Colleges and Universities, Los Angeles, March, 1970.

Exhibit 20

These categorizations are arbitrary, as are the identifications given above, but help explain some of the differences recorded in Exhibit 20. Gifts and grants for Category I, institutions, averaged $942, for example, while those in Category VI were $105. Since the latter schools are not engaged in research, their figure reflects primarily gifts.

This information is so fragmentary that it is of little direct benefit to an institution wishing to compare its position with others. The kinds of programs-graduate or not, size, endowment, all contribute to the pattern and the value of any income or expense category. It is for this reason, projects such as WICHE's MIS Program seek to develop data systems that will prove an exact basis for inter-institutional comparison. What is of interest in Exhibit 20 is the variability of expense per student among different categories. Some of this relates to the fixed and variable nature of the expenses and the size of the institution. Other variances relate to the institution's ability (endowment income, tuition) to support activities at a particular level. The specific question an institution in Category III might ask, is, why are we spending $475 a student on library and plant, when Categories II, IV, V and VI are spending less. If we spent say $242 instead of $474, would it seriously effect our academic program. How do we know, would this be better than a deficit, or raising tuition again? The totals by category suggest that institutions spend what money is available to them, though the pattern for the individual school may be obscured behind the averages the table presents.

PLANNING STRATEGIES

On the pages that follow, the testing of alternate planning strategies is illustrated for Nedrap University. The data used in the initial trial is drawn from the study of 50 private California colleges and universities. While there may be less opportunity to manipulate all of the factors in a public institution than in a private one, the modeling process is the same.

When data is applied to the simulation mode, three "print-out" sheets are produced by the computer as was shown in Exhibits 14, 15 and 16. The first two pages listed the data that is used in the model; enrollment, tuition rate, etc. The third sheet reproduced the operating budget as we normally see it. This then, was the basic data used for the trial runs that follow. In the initial 10 runs only one item is changed. For these (Trial 101 thru 110) the third page only of the print-out is displayed which shows the impact of that change on the operating budget. Later, when combinations of different factors are changed, all three print-out pages are reproduced.

NEDRAP UNIVERSITY

Trial No. 100: (Exhibits 14, 15 and 16) The Base Data for a Solvent Operation

This trial achieves a balance by projecting tuition at an annual increase of 9%. Since this is a higher rate than the expected rate of increase of real income, Nedrap University would have to attract its students from a numerically smaller pool unless it could change its scholarship support with outside funds.

The result might be a sudden decrease in attractiveness, a fall off of applicants, lower admissions requirements--a changed student body character.

The next ten trials use this data, and modifies one of the variables to determine its effect on the operating budget balance.

NEDRAP UNIVERSITY

Trial 101: (Exhibit 21) Tuition Rate Reduction

If the annual rate of tuition increase is reduced from 9% (trial 100) to 7%, an annual deficit of $130,708 occurs in the 8th year. This is in comparison with a surplus of $924,404 for the base data.

```
PAGE THREE     OPERATING BUDGET   RUN NUMBER    101.          6./ 7./1970.

ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                6700347.  7570635.  8556118.  9672254. 10936608. 12369120. 13992442. 15832308.
ENDOWMENT      1.0580   776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500     140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500  1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000     911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000    1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
   TOTAL INCOME       14128848. 15387034. 16785808. 18342484. 20076632. 22010368. 24168692. 26579884.


                                            EXPENSE
INSTRUCTION            4752861.  5232678.  5766618.  6361121.  7023413.  7761611.  8584826.  9503294.
GEN ADM EXP  1.1030     456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT   1.1030     840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP    1.0500    2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS            528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030     420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV  1.1030     599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES    1.0820     534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT   1.0820    1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700     265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450    1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200     277034.   302319.   330324.   361366.   395802.   434033.   476509.   523737.
   TOTAL EXPENSE      14128762. 15418306. 16846556. 18429708. 20185944. 22135712. 24301980. 26710592.

BALANCE                     86.   -31272.   -60748.   -87224.  -109312.  -125344.  -133288.  -130708.
```

THE EFFECT OF A TUITION RATE REDUCTION FROM
9 PERCENT (A 1975-76 SURPLUS OF
$924,404) TO 7 PERCENT

Exhibit 21

NEDRAP UNIVERSITY

Trial 102 and 103: Change in Student-Faculty Ratio

The annual rate of increase of tuition is returned to the 9% of the base year. Trial 102 displays the effect of a change in the student-faculty ratio from 15.5 to 15.0 to 1. The balance in the eighth year drops from $924,404 to $610,748.

Trial 103 (Exhibit 23) was an attempt to reduce the student-faculty ratio until a deficit occurred in the eighth year. However, when a ratio of 14.0 to 1 was reached, the deficit in the second year had already reached $315,472. This deficit tapers off and becomes a surplus in the seventh year because of the rapid increase in the tuition rate. Using a 9% annual increase, the dollar increase between the first and second year is $155. Between the seventh and eighth year the dollar increase is $261 in annual tuition. This program could be written so that the tuition rate is increased by a dollar amount rather than a fixed percentage. It is consistent however, since the growth factors are in percentages, to apply the same increase to tuition.

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    102.          6./ 8./1970.

ACCOUNT     GROWTH F     1968-69   1969-70    1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                 6700347.  7640733.   8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
ENDOWMENT      1.0580    776701.   821749.    869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500      140000.   147000.    154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500   2950000.  3097500.   3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500   1320000.  1386000.   1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450    194000.   202729.    211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000      911600.   911600.    911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000     1136200.  1249820.   1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
   TOTAL INCOME        14128848. 15457132. 16944984. 18613652. 20487348. 22593712. 24964264. 27634996.


                                                   EXPENSE
INSTRUCTION             4905124.  5400564.   5951910.  6565813.  7249742.  8012078.  8862240.  9810800.
GEN ADM EXP  1.1030      456000.   502968.    554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT   1.1030      840900.   927512.   1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP    1.0500     2466444.  2589766.   2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS             528728.   528728.    528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030      420000.   463260.    510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV  1.1030      599000.   660697.    728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES    1.0820      534000.   577788.    625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT   1.0820     1160795.  1255980.   1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700      265000.   283550.    303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450     1828000.  2093060.   2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200      280079.   305677.    334030.   365460.   400329.   439042.   482057.   529887.
   TOTAL EXPENSE       14284070. 15589550. 17035556. 18638492. 20416800. 22391188. 24584944. 27024248.

BALANCE                 -155222.  -132418.    -90572.   -24840.    70548.   202524.   379320.   610748.
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Exhibit 22

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    103.             6./ 8./1970.


ACCOUNT     GROWTH F     1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                 6700347.  7640733.  8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
ENDOWMENT     1.0580     776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500      140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP     1.0500    2950000.  3097500.  3252374.  3414993.  3585742.  3765026.  3953279.  4150943.
GIFT          1.0500    1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT     1.0450     194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000      911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID   1.1000    1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
   TOTAL INCOME        14128848. 15457132. 16944984. 18613652. 20487348. 22593712. 24964264. 27634996.


                                                   EXPENSE
INSTRUCTION             5067686.  5580028.  6149981.  6784623.  7491678.  8279820.  9158786. 10139510.
GEN ADM EXP   1.1030     456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT    1.1030     840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP     1.0500    2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS             528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030      420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV   1.1030     599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES     1.0820     534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT    1.0820    1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700      265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450     1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200      283335.   309266.   337991.   369836.   405168.   444397.   487988.   536461.
  TOTAL EXPENSE        14450088. 15772604. 17237588. 18861680. 20663576. 22664284. 24887420. 27359536.

BALANCE                 -321240.  -315472.  -292604.  -248028.  -176228.   -70572.    76844.   275460.
```

Exhibit 23

NEDRAP UNIVERSITY

Trial 104 and 105: Faculty Salaries

The base data includes an annual faculty salary increase of 7% a year.

Trial 104 increases faculty salaries at an annual rate of 8%. This reduces the eighth year balance from $924,404 to $383,196.

Trial 105 uses an annual increase of 9% and creates a deficit of $188,924 in the eighth year.

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PAGE THREE      OPERATING BUDGET   RUN NUMBER    104.            6./ 8./1970.


ACCOUNT     GROWTH F     1968-69   1969-70    1970-71    1971-72    1972-73    1973-74    1974-75    1975-76
TUITION                 6700347.  7640733.   8715294.   9943422.  11347324.  12952464.  14788014.  16887424.
ENDOWMENT      1.0580    776701.   821749.    869410.    919836.    973186.   1029631.   1089349.   1152531.
GEN AND DEPT 1.0500      140000.   147000.    154349.    162067.    170170.    178679.    187613.    196993.
AUX ENTRP      1.0500   2950000.  3097500.   3252374.   3414993.   3585742.   3765028.   3953279.   4150943.
GIFT           1.0500   1320000.  1386000.   1455299.   1528064.   1604467.   1684690.   1768925.   1857371.
ORG ACTVT      1.0450    194000.   202729.    211852.    221386.    231348.    241759.    252638.    264006.
RES AND GRTS 1.0000      911600.   911600.    911600.    911600.    911600.    911600.    911600.    911600.
FINANCE AID    1.1000   1136200.  1249820.   1374801.   1512281.   1663509.   1829860.   2012846.   2214130.
   TOTAL INCOME        14128848. 15457132.  16944984.  18613652.  20487348.  22593712.  24964264.  27634996.


                                                   EXPENSE
INSTRUCTION             4752861.  5270188.   5850925.   6503265.   7236491.   8061122.   8989086.  10033888.
GEN ADM EXP    1.1030    456000.   502968.    554773.    611915.    674942.    744461.    821140.    905718.
GEN INSTUT     1.1030    840900.   927512.   1023046.   1128420.   1244647.   1372845.   1514248.   1670215.
AUX ENTRP      1.0500   2466444.  2589766.   2719254.   2855217.   2997977.   3147876.   3305269.   3470532.
RES AND GRTS             528728.   528728.    528728.    528728.    528728.    528728.    528728.    528728.
PUBLC SERVCE 1.1030      420000.   463260.    510975.    563606.    621657.    685688.    756313.    834213.
STUDNT SERV    1.1030    599000.   660697.    728748.    803809.    886601.    977921.   1078647.   1189748.
LIBRARIES      1.0820    534000.   577788.    625166.    676429.    731896.    791912.    856848.    927109.
PHYS PLANT     1.0820   1160795.  1255980.   1358970.   1470405.   1590977.   1721437.   1862594.   2015327.
ORG ACTIVITY 1.0700      265000.   283550.    303398.    324636.    347360.    371675.    397693.    425531.
FINAN.    AID 1.1450    1828000.  2093060.   2396553.   2744053.   3141941.   3597522.   4119162.   4716441.
CONTINGENCY   0.0200     277034.   303069.    332010.    364209.    400064.    440023.    484594.    534349.
   TOTAL EXPENSE       14128762. 15456566.  16932548.  18574696.  20403284.  22441212.  24714324.  27251800.

BALANCE                      86.       566.     12436.     38956.     84064.    152500.    249940.    383196.
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Exhibit 24

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    105.            7./ 8./1970.


ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                6700347.  7640733.  8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
ENDOWMENT       1.0580  776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500    140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500  1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000     911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000    1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
    TOTAL INCOME      14128848. 15457132. 16944984. 18613652. 20487348. 22593712. 24964264. 27634996.


                                                EXPENSE
INSTRUCTION            4752861.  5307700.  5936015.  6648065.  7455570.  8371937.  9412498. 10594790.
GEN ADM EXP    1.1030   456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT     1.1030   840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP      1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS            528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030     420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV    1.1030   599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES      1.0820   534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT     1.0820  1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700     265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.    AID 1.1450   1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY   0.0200    277034.   303820.   333712.   367105.   404445.   446240.   493062.   545567.
   TOTAL EXPENSE      14128762. 15494828. 17019340. 18722392. 20626744. 22758244. 25146204. 27823920.

BALANCE                     86.   -37696.   -74356.  -108740.  -139396.  -164532.  -181940.  -188924.
```

Exhibit 25

NEDRAP UNIVERSITY

Trial 106 and 107: Changes in enrollment

If the undergraduate enrollment is stabilized--the growth factor changes to 1.0 from 1.055, the eight year surplus of $924,404 becomes a deficit of $1,099,164. The income pattern in this base data is highly dependent on an expanding enrollment and a rapid increase in tuition.

In trial 107, the enrollment of all programs, undergraduate and graduate, are reduced to a constant level. The eight year deficit is $1,181,828.

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    106.          7./ 8./1970.

ACCOUNT    GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION               6700347.  7337145.  8035273.  8800738.  9640140. 10560748. 11570554. 12678358.
ENDOWMENT      1.0580  776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500    140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500 2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500 1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450  194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000    911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000   1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
   TOTAL INCOME      14128848. 15153544. 16264962. 17470968. 18780164. 20201996. 21746804. 23425932.


                                                  EXPENSE
INSTRUCTION           4752861.  5047419.  5364672.  5706445.  6074700.  6471579.  6899393.  7360648.
GEN ADM EXP  1.1030    456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT   1.1030    840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP    1.0500   2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030    420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV  1.1030    599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES    1.0820    534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT   1.0820   1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700    265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450   1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200    277034.   298614.   322285.   348273.   376828.   408232.   442800.   480884.
   TOTAL EXPENSE     14128762. 15229342. 16436570. 17761936. 19218256. 20819880. 22582840. 24525096.

BALANCE                    86.   -75798.  -171608.  -290968.  -438092.  -617884.  -836036. -1099164.
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Exhibit 26

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PAGE THREE      OPERATING BUDGET   RUN NUMBER    107.            7./ 8./1970.

ACCOUNT     GROWTH F     1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                 6700347.  7303378.  7960679.  8677138.  9458080. 10309304. 11237142. 12248482.
ENDOWMENT      1.0580    776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500      140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500   2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500   1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450    194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000      911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000     1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
    TOTAL INCOME       14128848. 15119776. 16190368. 17347368. 18598104. 19950552. 21413392. 22996056.


                                                EXPENSE
INSTRUCTION             4752861.  5015199.  5295789.  5595902.  5916899.  6260233.  6627461.  7020245.
GEN ADM EXP    1.1030    456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT     1.1030    840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP      1.0500   2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS             528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030      420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV    1.1030    599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES      1.0820    534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT     1.0820   1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700      265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450     1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200      277034.   297970.   320908.   346062.   373672.   404006.   437362.   474076.
   TOTAL EXPENSE       14128762. 15196478. 16366310. 17649184. 19057300. 20604304. 22305468. 24177884.

BALANCE                      86.   -76702.  -175942.  -301816.  -459196.  -653752.  -892076. -1181828.
```

Exhibit 27

NEDRAP UNIVERSITY

Trial 108: Research Grants

What is the effect of a rapid phasing out of research grants? If they are halved each year, and nearly eliminated by the eighth year, the balance is reduced from $924,404 to $555,016.

This is an example of where a more precise model could be developed. When a grant is phased out, certain expenses such as secretarial expense, and even some faculty salaries, may need to be picked up by the instructional budget. The interaction of the funded research budget, and other budgets is much more complicated than this model displays. This model merely shows grant income, equals grant expenses, plus overhead.

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PAGE THREE      OPERATING BUDGET   RUN NUMBER    108.           7./ 8./1970.


ACCOUNT    GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION               6700347.  7640733.  8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
ENDOWMENT     1.0580   776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500    140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP     1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT          1.0500  1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT     1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 0.5000    911600.   455800.   227900.   113950.    56975.    28487.    14243.     7121.
FINANCE AID   1.1000  1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
    TOTAL INCOME     14128848. 15001332. 16261282. 17816000. 19632724. 21710600. 24066908. 26730520.


                                                  EXPENSE
INSTRUCTION           4752861.  5232678.  5766618.  6361121.  7023413.  7761611.  8584826.  9503294.
GEN ADM EXP   1.1030   456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT    1.1030   840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP     1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   264364.   132182.    66091.    33045.    16522.     8261.     4130.
PUBLC SERVCE 1.1030    420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV   1.1030   599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES     1.0820   534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT    1.0820  1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700    265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450   1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200    277034.   297032.   322393.   352114.   385889.   423789.   466100.   513245.
    TOTAL EXPENSE    14128762. 15148656. 16442078. 17957816. 19680348. 21613264. 23771104. 26175504.

BALANCE                    86.  -147324.  -180796.  -141816.   -47624.    97336.   295804.   555016.
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Exhibit 28

NEDRAP UNIVERSITY

Trial 109: Impact of Changes in Faculty Rank

When the enrollment of an institution stabilizes, there are fewer new faculty added. There is not a new input of faculty at the instructor or assistant rank. Promotions continue to take place. The number in the higher ranks increase, the lower ranks decrease. What is the impact on the salary expense. In trial 109 the professor, associate and assistant percentages, of all ranks, are changed from 21, 18 and 47, to 30, 30, and 26 percent. The balance moves from $924,404 to $398,588 in the eighth year.

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    109.            7./ 8./1970.

ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                6700347.  7640733.  8715294.  9943422. 11347324. 12952464. 14788014. 16887424.
ENDOWMENT      1.0580   776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500     140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP      1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0500  1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT      1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000     911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID    1.1000  1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
    TOTAL INCOME      14128848. 15457132. 16944984. 18613652. 20487348. 22593712. 24964264. 27634996.


                                                 EXPENSE
INSTRUCTION            4987481.  5495051.  6060092.  6689456.  7390829.  8172846.  9045206. 10018798.
GEN ADM EXP    1.1030   456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT     1.1030   840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP      1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS            528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030     420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV    1.1030   599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES      1.0820   534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT     1.0820  1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700     265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450    1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY    0.0200   281726.   307567.   336194.   367933.   403151.   442258.   485717.   534047.
    TOTAL EXPENSE     14368074. 15685926. 17145900. 18764608. 20560708. 22555172. 24771568. 27236408.

BALANCE                -239226.  -228794.  -200916.  -150956.   -73360.    38540.   192696.   398588.
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Exhibit 29

NEDRAP UNIVERSITY

Trial 110: Change in the Tuition Rate with a Stabilized Enrollment

The base data tuition increase was fixed at a rate of 9% per year. Trial 110 reduces the increase to 7% a year. A deficit of $1,112,336 occurs in the eighth year--nearly a two million dollar change from the base data. As with most independent schools, Nedrap University is very sensitive to tuition income.

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PAGE THREE      OPERATING BUDGET   RUN NUMBER    110.           7./ 8./1970.

ACCOUNT    GROWTH F     1968-69  1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION              6700347.  7500536.  8398402.  9406058. 10537136. 11806978. 13232854. 14834206.
ENDOWMENT     1.0580   776701.   821749.   869410.   919836.   973186.  1029631.  1089349.  1152531.
GEN AND DEPT 1.0500   140000.   147000.   154349.   162067.   170170.   178679.   187613.   196993.
AUX ENTRP     1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT          1.0500  1320000.  1386000.  1455299.  1528064.  1604467.  1684690.  1768925.  1857371.
ORG ACTVT     1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 1.0000   911600.   911600.   911600.   911600.   911600.   911600.   911600.   911600.
FINANCE AID  1.1000  1136200.  1249820.  1374801.  1512281.  1663509.  1829860.  2012846.  2214130.
   TOTAL INCOME      14128848. 15316934. 16628090. 18076288. 19677160. 21448228. 23409104. 25581780.


                                              EXPENSE
INSTRUCTION            4752861.  5232678.  5766618.  6361121.  7023413.  7761611.  8584826.  9503294.
GEN ADM EXP   1.1030   456000.   502968.   554773.   611915.   674942.   744461.   821140.   905718.
GEN INSTUT    1.1030   840900.   927512.  1023046.  1128420.  1244647.  1372845.  1514248.  1670215.
AUX ENTRP     1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   528728.   528728.   528728.   528728.   528728.   528728.   528728.
PUBLC SERVCE 1.1030   420000.   463260.   510975.   563606.   621657.   685688.   756313.   834213.
STUDNT SERV   1.1030   599000.   660697.   728748.   803809.   886601.   977921.  1078647.  1189748.
LIBRARIES     1.0820   534000.   577788.   625166.   676429.   731896.   791912.   856848.   927109.
PHYS PLANT    1.0820  1160795.  1255980.  1358970.  1470405.  1590977.  1721437.  1862594.  2015327.
ORG ACTIVITY 1.0700   265000.   283550.   303398.   324636.   347360.   371675.   397693.   425531.
FINAN.   AID 1.1450  1828000.  2093060.  2396553.  2744053.  3141941.  3597522.  4119162.  4716441.
CONTINGENCY  0.0200   277034.   302319.   330324.   361366.   395802.   434033.   476509.   523737.
   TOTAL EXPENSE     14128762. 15418306. 16846556. 18429708. 20185944. 22135712. 24301980. 26710592.

BALANCE                    86.  -101372.  -218464.  -353420.  -508784.  -687484.  -892876. -1128812.
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Exhibit 30

NEDRAP UNIVERSITY

Trial 111 (Exhibits 31, 32 and 33): Reduce Rate of Tuition and Achieve Balanced Operation

It is assumed that inflation will increase at an annual rate of 5% during the next eight years. Therefore, any activity increased as a growth rate less than that is, in effect, a reduction in the level of service.

Compared with the previous trials, the following changes are introduced:

	Growth Factors
Endowment Income	1.025
General and Department Income	1.06
Research and Grant Income	.96
Gift Income	1.052
Tuition Rate	1.075
Percent Professor Rank	.25
Percent Associate Rank	.25
Percent Assistant Rank	.36
Faculty Salaries	1.06
Administrative Expense	1.07
General Institutional Expense	1.07
Public Service	1.05
Physical Plant	1.07
Student Services	1.05
Organized Activities	1.05
Undergraduate Enrollment	1.00
Financial Aid	1.097

The purpose of this trial was to reduce the annual tuition rate increase to 7 1/2%. This is anticipated to be the rate of increase of real income, including inflation. Further, undergraduate enrollment is stabilized at its present level of 2900 undergraduates. The rate of growth of the various expense accounts is adjusted so that a financial balance can be obtained.

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                 EIGHT YEAR FINANCIAL PROJECTION  1969-1976     NEDRAP UNIVERSITY

        RUN NUMBER    111.         7./ 8./   1970.ROBERT J. PARDEN

                                     ENROLLMENT PROJECTIONS
                     1968-69 1969-70  1970-71 1971-72 1972-73 1973-74 1974-75 1975-76

UG ENROLLMENT          2900.   2900.    2900.   2900.   2900.   2900.   2900.   2900.
LAW ENROLL              264.    269.     274.    280.    285.    291.    297.    303.
GRAD ARTS                92.     96.     101.    106.    111.    117.    123.    129.
GRAD BUS                586.    597.     609.    621.    634.    646.    659.    673.
GRAD ENGR               307.    313.     319.    325.    332.    338.    345.    352.
   TOTAL REGULAR FTE   4149.   4176.    4205.   4234.   4264.   4294.   4326.   4358.

EXTENSION               120.    126.     132.    138.    145.    153.    160.    168.
SUMMER SCH             1458.   1458.    1458.   1458.   1458.   1458.   1458.   1458.
MGT CENTER               27.     27.      27.     27.     27.     27.     27.     27.
   ENROLL-TOTAL        5754.   5787.    5822.   5858.   5895.   5932.   5972.   6012.

   ENROLLMENT FACTORS   FTE       FTE GF     TUITION ADJ FACTR
UNDERGRADUATES         2900.      1.0000       0.9880          PERCENT PROFS          0.2500
LAW                     264.      1.0200       0.8300          PERCENT ASSOC          0.2500
GRAD ARTS                92.      1.0500       0.5200          PERCENT ASSISTANTS     0.3600
GRAD BUSINESS           586.      1.0200       0.4600          PERCENT INSTRUCTORS    0.0400
GRAD ENGINEER           307.      1.0200       0.6320          PERCENT LECTURERS      0.0700
EXTENSION               120.      1.0500       0.2470          PERCENT OTHER RANKS    0.0300
SUMMER SCHOOL          1458.      1.0000       0.0810
MGT CENTER               27.      1.0000       1.7600

             DATA USED IN PROJECTIONS
  RES AND GRANT OVERHEAD RATE             0.4200
  TUITION RATE   INCREASE                 1.0750
  STUDENT FACULTY RATIO                  15.5000
  STUD-FAC RATIO GF                       1.0000
  FAC SALARY GROWTH RATE                  1.0600
  COMPENSATION PERCENT                    0.0900
  COMPENSATION GROWTH RATE                1.0020
  INSTR SUPPORT GF                        1.1030
  INSTRUCTIONAL SUPPORT PER FTEF       3315.0004
  INIT SS, EXT,MGT C,ROTC EXP        185000.0316
  SS,EXT MC RO GFACTOR                    1.0600
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Exhibit 31

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PAGE 2   KEY VALUES PROJECTED    RUN NUMBER    111.         7./ 8./1970.

                   1968-69  1969-70  1970-71  1971-72  1972-73  1973-74  1974-75  1975-76
NO.PROF                66.      67.      67.      68.      68.      69.      69.      70.
NO.ASSOC               66.      67.      67.      68.      68.      69.      69.      70.
NO.ASST.               96.      97.      97.      98.      99.      99.     100.     101.
NO.INSTR.              10.      10.      10.      10.      11.      11.      11.      11.
NO.LECT.               18.      18.      18.      19.      19.      19.      19.      19.
OTHER FACULTY           8.       8.       8.       8.       8.       8.       8.       8.

AVG SAL PROF        15380.   16302.   17280.   18317.   19416.   20581.   21816.   23125.
AVG SAL ASSOC       12637.   13395.   14198.   15050.   15953.   16911.   17925.   19001.
AVG SAL ASST         9984.   10583.   11218.   11891.   12604.   13360.   14162.   15012.
AVG SAL INSTR        8307.    8805.    9333.    9893.   10487.   11116.   11783.   12490.
AVG SAL LECT        21000.   22260.   23595.   25011.   26512.   28102.   29788.   31576.
AVG SAL OTHER       10000.   10600.   11235.   11910.   12624.   13382.   14185.   15036.
ENROLLMEN-REGULAR    4149.    4176.    4205.    4234.    4264.    4294.    4326.    4358.

TUITION RATE         1725.    1854.    1993.    2142.    2303.    2476.    2662.    2861.
FTE FACULTY           267.     269.     271.     273.     275.     277.     279.     281.
STUD-FAC RATIO     15.5000  15.5000  15.5000  15.5000  15.5000  15.5000  15.5000  15.5000
TOTAL FAC SAL     3399707. 3627783. 3871627. 4132369. 4411222. 4709492. 5028580. 5369995.
TOTAL COMP         306585.  327153.  349143.  372656.  397803.  424701.  453477.  484265.
INSTR SUPPORT      978747.  985291.  991998.  998874. 1005923. 1013150. 1020562. 1028164.
SS,MGTC,EXT,EXP    185000.  196100.  207865.  220337.  233558.  247571.  262425.  278171.
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Exhibit 32

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    111.            7./ 8./1970.


ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION                6700347.  7236174.  7815640.  8442380.  9120340.  9853812. 10647452. 11506318.
ENDOWMENT      1.0250   776701.   796118.   816021.   836421.   857332.   878765.   900734.   923252.
GEN AND DEPT 1.0600     140000.   148400.   157303.   166742.   176746.   187351.   198592.   210508.
AUX ENTRP      1.0500  2950000.  3097500.  3252374.  3414993.  3585742.  3765028.  3953279.  4150943.
GIFT           1.0520  1320000.  1388639.  1460848.  1536812.  1616726.  1700795.  1789236.  1882276.
ORG ACTVT      1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 0.9600     911600.   875136.   840130.   806525.   774263.   743293.   713561.   685018.
FINANCE AID  1.0600    1136200.  1204372.  1276634.  1353231.  1434425.  1520490.  1611720.  1708423.
   TOTAL INCOME       14128848. 14949068. 15830804. 16778492. 17796924. 18891296. 20067212. 21330744.


                                                   EXPENSE
INSTRUCTION            4870040.  5136328.  5420635.  5724238.  6048506.  6394916.  6765045.  7160596.
GEN ADM EXP    1.0700   456000.   487920.   522074.   558619.   597722.   639563.   684332.   732235.
GEN INSTUT     1.0700   840900.   899763.   962746.  1030138.  1102248.  1179405.  1261963.  1350300.
AUX ENTRP      1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS            528728.   507578.   487275.   467784.   449073.   431110.   413865.   397310.
PUBLC SERVCE 1.0500     300000.   315000.   330749.   347287.   364651.   382884.   402028.   422129.
STUDNT SERV    1.0500   599000.   628950.   660397.   693417.   728087.   764492.   802716.   842852.
LIBRARIES      1.0600   534000.   566040.   600002.   636002.   674162.   714611.   757488.   802937.
PHYS PLANT     1.0700  1160795.  1242050.  1328994.  1422023.  1521564.  1628074.  1742039.  1863981.
ORG ACTIVITY 1.0500     265000.   278250.   292162.   306770.   322109.   338214.   355125.   372881.
FINAN.    AID 1.0970   1828000.  2005316.  2199831.  2413214.  2647295.  2904082.  3185778.  3494798.
CONTINGENCY   0.0200    276978.   293139.   310482.   329094.   349067.   370504.   393513.   418211.
   TOTAL EXPENSE      14125886. 14950100. 15834604. 16783804. 17802464. 18895732. 20069164. 21328768.

BALANCE                   2962.    -1032.    -3800.    -5312.    -5540.    -4436.    -1952.     1976.
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Exhibit 33

NEDRAP UNIVERSITY

Trial 112: (Exhibits 34,35 and 36) Reduction in Auxilary Enterprise Surplus

There is concern that with the occupancy rate of the dormitories declining, the auxilary enterprise income might not exceed the auxilary enterprise expense. Continuing with the data from trial 111, and reducing the auxilary enterprise income until it equals expenses in the eighth year it can be seen that it creates a deficit of $666,224.

The next trial seeks to eliminate that.

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                EIGHT YEAR FINANCIAL PROJECTION  1969-1976     NEDRAP UNIVERSITY

          RUN NUMBER    112.         7./ 8./   1970.ROBERT J. PARDEN

                                    ENROLLMENT PROJECTIONS
                 1968-69 1969-70  1970-71 1971-72 1972-73 1973-74 1974-75 1975-76

UG ENROLLMENT      2900.   2900.   2900.   2900.   2900.   2900.   2900.   2900.
LAW ENROLL          264.    269.    274.    280.    285.    291.    297.    303.
GRAD ARTS            92.     96.    101.    106.    111.    117.    123.    129.
GRAD BUS            586.    597.    609.    621.    634.    646.    659.    673.
GRAD ENGR           307.    313.    319.    325.    332.    338.    345.    352.
   TOTAL REGULAR FTE 4149.  4176.   4205.   4234.   4264.   4294.   4326.   4358.

EXTENSION           120.    126.    132.    138.    145.    153.    160.    168.
SUMMER SCH         1458.   1458.   1458.   1458.   1458.   1458.   1458.   1458.
MGT CENTER           27.     27.     27.     27.     27.     27.     27.     27.
   ENROLL-TOTAL    5754.   5787.   5822.   5858.   5895.   5932.   5972.   6012.

  ENROLLMENT FACTORS   FTE      FTE GF    TUITION ADJ FACTR
UNDERGRADUATES        2900.     1.0000      0.9880         PERCENT PROFS        0.2500
LAW                    264.     1.0200      0.8300         PERCENT ASSOC        0.2500
GRAD ARTS               92.     1.0500      0.5200         PERCENT ASSISTANTS   0.3600
GRAD BUSINESS          586.     1.0200      0.4600         PERCENT INSTRUCTORS  0.0400
GRAD ENGINEER          307.     1.0200      0.6320         PERCENT LECTURERS    0.0700
EXTENSION              120.     1.0500      0.2470         PERCENT OTHER RANKS  0.0300
SUMMER SCHOOL         1458.     1.0000      0.0810
MGT CENTER              27.     1.0000      1.7600

                DATA USED IN PROJECTIONS
   RES AND GRANT OVERHEAD RATE             0.4200
   TUITION RATE   INCREASE                 1.0750
   STUDENT FACULTY RATIO                  15.5000
   STUD-FAC RATIO GF                       1.0000
   FAC SALARY GROWTH RATE                  1.0600
   COMPENSATION PERCENT                    0.0900
   COMPENSATION GROWTH RATE                1.0020
   INSTR SUPPORT GF                        1.1030
   INSTRUCTIONAL SUPPORT PER FTEF  3315.0004
   INIT SS, EXT,MGT C,ROTC EXP   185000.0316
   SS,EXT MC RO GFACTOR                    1.0600
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Exhibit 34

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PAGE 2   KEY VALUES PROJECTED    RUN NUMBER    112.            7./ 8./1970.

                     1968-69  1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
NO.PROF                  66.      67.       67.       68.       68.       69.       69.       70.
NO.ASSOC                 66.      67.       67.       68.       68.       69.       69.       70.
NO.ASST.                 96.      97.       97.       98.       99.       99.      100.      101.
NO.INSTR.                10.      10.       10.       10.       11.       11.       11.       11.
NO.LECT.                 18.      18.       18.       19.       19.       19.       19.       19.
OTHER FACULTY             8.       8.        8.        8.        8.        8.        8.        8.

AVG SAL PROF          15380.   16302.    17280.    18317.    19416.    20581.    21816.    23125.
AVG SAL ASSOC         12637.   13395.    14198.    15050.    15953.    16911.    17925.    19001.
AVG SAL ASST           9984.   10583.    11218.    11891.    12604.    13360.    14162.    15012.
AVG SAL INSTR          8307.    8805.     9333.     9893.    10487.    11116.    11783.    12490.
AVG SAL LECT          21000.   22260.    23595.    25011.    26512.    28102.    29788.    31576.
AVG SAL OTHER         10000.   10600.    11235.    11910.    12624.    13382.    14185.    15036.
ENROLLMEN-REGULAR      4149.    4176.     4205.     4234.     4264.     4294.     4326.     4358.

TUITION RATE           1725.    1854.     1993.     2142.     2303.     2476.     2662.     2861.
FTE FACULTY             267.     269.      271.      273.      275.      277.      279.      281.
STUD-FAC RATIO      15.5000  15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000
TOTAL FAC SAL      3399707. 3627783.  3871627.  4132369.  4411222.  4709492.  5028580.  5369995.
TOTAL COMP          306585.  327153.   349143.   372656.   397803.   424701.   453477.   484265.
INSTR SUPPORT       978747.  985291.   991998.   998874.  1005923.  1013150.  1020562.  1028164.
SS,MGTC,EXT,EXP     185000.  196100.   207865.   220337.   233558.   247571.   262425.   278171.
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Exhibit 35

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    112.          7./ 8./1970.


ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION               6700347.  7236174.  7815640.  8442380.  9120340.  9853812. 10647452. 11506318.
ENDOWMENT     1.0250   776701.   796118.   816021.   836421.   857332.   878765.   900734.   923252.
GEN AND DEPT 1.0600    140000.   148400.   157303.   166742.   176746.   187351.   198592.   210508.
AUX ENTRP     1.0240  2950000.  3020800.  3093298.  3167537.  3243557.  3321402.  3401115.  3482742.
GIFT          1.0520  1320000.  1388639.  1460848.  1536812.  1616726.  1700795.  1789236.  1882276.
ORG ACTVT     1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 0.9600    911600.   875136.   840130.   806525.   774263.   743293.   713561.   685018.
FINANCE AID  1.0600   1136200.  1204372.  1276634.  1353231.  1434425.  1520490.  1611720.  1708423.
   TOTAL INCOME      14128848. 14872368. 15671728. 16531034. 17454740. 18447668. 19515048. 20662544.


                                                  EXPENSE
INSTRUCTION           4870040.  5136328.  5420635.  5724238.  6048506.  6394916.  6765045.  7160596.
GEN ADM EXP   1.0700   456000.   487920.   522074.   558619.   597722.   639563.   684332.   732235.
GEN INSTUT    1.0700   840900.   899763.   962746.  1030138.  1102248.  1179405.  1261963.  1350300.
AUX ENTRP     1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   507578.   487275.   467784.   449073.   431110.   413865.   397310.
PUBLC SERVCE 1.0500    300000.   315000.   330749.   347287.   364651.   382884.   402028.   422129.
STUDNT SERV   1.0500   599000.   628950.   660397.   693417.   728087.   764492.   802716.   842852.
LIBRARIES     1.0600   534000.   566040.   600002.   636002.   674162.   714611.   757488.   802937.
PHYS PLANT    1.0700  1160795.  1242050.  1328994.  1422023.  1521564.  1628074.  1742039.  1863981.
ORG ACTIVITY 1.0500    265000.   278250.   292162.   306770.   322109.   338214.   355125.   372881.
FINAN.   AID 1.0970   1828000.  2005316.  2199831.  2413214.  2647295.  2904082.  3185778.  3494798.
CONTINGENCY  0.0200    276978.   293139.   310482.   329094.   349067.   370504.   393513.   418211.
   TOTAL EXPENSE     14125886. 14950100. 15834604. 16783804. 17802464. 18895732. 20069164. 21328768.

BALANCE                  2962.   -77732.  -162876.  -252768.  -347724.  -448064.  -554116.  -666224.
```

Exhibit 36

NEDRAP UNIVERSITY

Trial 113: (Exhibits 37, 38 and 39)

The deficit in trial 112 caused by a reduction in auxilary enterprise income is eliminated by reducing:

General Administration
General Institution
Libraries
Physical Plant

to a 5% growth or just enough to cover inflation.

Financial aids is reduced from a 9.7% growth factor to 9.1%.

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                 EIGHT YEAR FINANCIAL PROJECTION  1969-1976     NEDRAP UNIVERSITY

        RUN NUMBER    113.          7./ 8./   1970.ROBERT J. PARDEN

                                      ENROLLMENT PROJECTIONS
                 1968-69 1969-70  1970-71 1971-72 1972-73 1973-74 1974-75 1975-76

UG ENROLLMENT             2900.   2900.   2900.   2900.   2900.   2900.   2900.   2900.
LAW ENROLL                 264.    269.    274.    280.    285.    291.    297.    303.
GRAD ARTS                   92.     96.    101.    106.    111.    117.    123.    129.
GRAD BUS                   586.    597.    609.    621.    634.    646.    659.    673.
GRAD ENGR                  307.    313.    319.    325.    332.    338.    345.    352.
    TOTAL REGULAR FTE     4149.   4176.   4205.   4234.   4264.   4294.   4326.   4358.

EXTENSION                  120.    126.    132.    138.    145.    153.    160.    168.
SUMMER SCH                1458.   1458.   1458.   1458.   1458.   1458.   1458.   1458.
MGT CENTER                  27.     27.     27.     27.     27.     27.     27.     27.
    ENROLL-TOTAL          5754.   5787.   5822.   5858.   5895.   5932.   5972.   6012.

   ENROLLMENT FACTORS    FTE       FTE GF    TUITION ADJ FACTR
UNDERGRADUATES          2900.      1.0000       0.9880         PERCENT PROFS        0.2500
LAW                      264.      1.0200       0.8300         PERCENT ASSOC        0.2500
GRAD ARTS                 92.      1.0500       0.5200         PERCENT ASSISTANTS   0.3600
GRAD BUSINESS            586.      1.0200       0.4600         PERCENT INSTRUCTORS  0.0400
GRAD ENGINEER            307.      1.0200       0.6320         PERCENT LECTURERS    0.0700
EXTENSION                120.      1.0500       0.2470         PERCENT OTHER RANKS  0.0300
SUMMER SCHOOL           1458.      1.0000       0.0810
MGT CENTER                27.      1.0000       1.7600

             DATA USED IN PROJECTIONS
   RES AND GRANT OVERHEAD RATE          0.4200
   TUITION RATE   INCREASE              1.0750
   STUDENT FACULTY RATIO               15.5000
   STUD-FAC RATIO GF                    1.0000
   FAC SALARY GROWTH RATE               1.0600
   COMPENSATION PERCENT                 0.0900
   COMPENSATION GROWTH RATE             1.0020
   INSTR SUPPORT GF                     1.1030
   INSTRUCTIONAL SUPPORT PER FTEF    3315.0004
   INIT SS, EXT,MGT C,ROTC EXP     185000.0316
   SS,EXT MC RO GFACTOR                 1.0600
```

Exhibit 37

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PAGE 2   KEY VALUES PROJECTED     RUN NUMBER    113.          7./ 8./1970.

                      1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
NO.PROF                   66.       67.       67.       68.       68.       69.       69.       70.
NO.ASSOC                  66.       67.       67.       68.       68.       69.       69.       70.
NO.ASST.                  96.       97.       97.       98.       99.       99.      100.      101.
NO.INSTR.                 10.       10.       10.       10.       11.       11.       11.       11.
NO.LECT.                  18.       18.       18.       I9.       19.       19.       19.       19.
OTHER FACULTY              8.        8.        8.        8.        8.        8.        8.        8.

AVG SAL PROF           15380.    16302.    17280.    18317.    19416.    20581.    21816.    23125.
AVG SAL ASSOC          12637.    13395.    14198.    15050.    15953.    16911.    17925.    19001.
AVG SAL ASST            9984.    10583.    11218.    11891.    12604.    13360.    14162.    15012.
AVG SAL INSTR           8307.     8805.     9333.     9893.    10487.    11116.    11783.    12490.
AVG SAL LECT           21000.    22260.    23595.    25011.    26512.    28102.    29788.    31576.
AVG SAL OTHER          10000.    10600.    11235.    11910.    12624.    13382.    14185.    15036.
ENROLLMEN-REGULAR       4149.     4176.     4205.     4234.     4264.     4294.     4326.     4358.

TUITION RATE            1725.     1854.     1993.     2142.     2303.     2476.     2662.     2861.
FTE FACULTY              267.      269.      271.      273.      275.      277.      279.      281.
STUD-FAC RATIO       15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000
TOTAL FAC SAL       3399707.  3627783.  3871627.  4132369.  4411222.  4709492.  5028580.  5369995.
TOTAL COMP           306585.   327153.   349143.   372656.   397803.   424701.   453477.   484265.
INSTR SUPPORT        978747.   985291.   991998.   998874.  1005923.  1013150.  1020562.  1028164.
SS,MGTC,EXT,EXP      185000.   196100.   207865.   220337.   233558.   247571.   262425.   278171.
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Exhibit 38

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    113.          7./ 8./1970.


ACCOUNT    GROWTH F   1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION               6700347.  7236174.  7815640.  8442380.  9120340.  9853812. 10647452. 11506318.
ENDOWMENT    1.0250    776701.   796118.   816021.   836421.   857332.   878765.   900734.   923252.
GEN AND DEPT 1.0600    140000.   148400.   157303.   166742.   176746.   187351.   198592.   210508.
AUX ENTRP    1.0240   2950000.  3020800.  3093298.  3167537.  3243557.  3321402.  3401115.  3482742.
GIFT         1.0520   1320000.  1388639.  1460848.  1536812.  1616726.  1700795.  1789236.  1882276.
ORG ACTVT    1.0450    194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 0.9600    911600.   875136.   840130.   806525.   774263.   743293.   713561.   685018.
FINANCE AID  1.0600   1136200.  1204372.  1276634.  1353231.  1434425.  1520490.  1611720.  1708423.
   TOTAL INCOME      14128848. 14872368. 15671728. 16531034. 17454740. 18447668. 19515048. 20662544.


                                                 EXPENSE
INSTRUCTION           4870040.  5136328.  5420635.  5724238.  6048506.  6394916.  6765045.  7160596.
GEN ADM EXP  1.0500    456000.   478800.   502739.   527876.   554270.   581984.   611083.   641637.
GEN INSTUT   1.0500    840900.   882945.   927092.   973446.  1022118.  1073224.  1126885.  1183229.
AUX ENTRP    1.0500   2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   507578.   487275.   467784.   449073.   431110.   413865.   397310.
PUBLC SERVCE 1.0500    300000.   315000.   330749.   347287.   364651.   382884.   402028.   422129.
STUDNT SERV  1.0500    599000.   628950.   660397.   693417.   728087.   764492.   802716.   842852.
LIBRARIES    1.0500    534000.   560700.   588734.   618171.   649080.   681533.   715610.   751390.
PHYS PLANT   1.0500   1160795.  1218834.  1279776.  1343764.  1410952.  1481500.  1555575.  1633353.
ORG ACTIVITY 1.0500    265000.   278250.   292162.   306770.   322109.   338214.   355125.   372881.
FINAN.   AID 1.0910   1828000.  1994347.  2175833.  2373833.  2589851.  2825526.  3082648.  3363168.
CONTINGENCY  0.0200    276978.   291830.   307693.   324636.   342733.   362065.   382717.   404781.
   TOTAL EXPENSE     14125886. 14883330. 15692342. 16556442. 17479412. 18465328. 19518568. 20643864.

BALANCE                  2962.   -10962.   -20614.   -25408.   -24672.   -17660.    -3520.    18680.
```

Exhibit 39

NEDRAP UNIVERSITY

Trial 114: (Exhibits 35, 40, 41 and 42) Controlled Enrollment Increase

How do you create some financial flexibility for new programs, or for emergencies not covered by the contingency fund. Increased gifts and endowment is a continuing program not subject to quick manipulation. The tuition rate could be increased but this would further stress the financial aid program which has already been diminished.

If the expenses could be held to the planned level, of trial 113, and if physical facilities will allow, then a controlled increase in enrollment will help--providing there are acceptable applicants. An eighth year surplus of $876,232 displays the appeal of this plan. Undergraduates are allowed to increase by 3% a year. The 1968-69 enrollment of 2900 moves up to 3566 in the 7th year. This is, of course, only a short term solution. A whole new set of facilities will be necessary, eventually.

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                EIGHT YEAR FINANCIAL PROJECTION  1969-1976     NEDRAP UNIVERSITY

          RUN NUMBER    114.          7./ 8./   1970.ROBERT J. PARDEN

                                     ENROLLMENT PROJECTIONS
                1968-69 1969-70  1970-71 1971-72 1972-73 1973-74 1974-75 1975-76

 UG ENROLLMENT    2900.   2987.   3076.   3168.   3263.   3361.   3462.   3566.
 LAW ENROLL        264.    269.    274.    280.    285.    291.    297.    303.
 GRAD ARTS          92.     96.    101.    106.    111.    117.    123.    129.
 GRAD BUS          586.    597.    609.    621.    634.    646.    659.    673.
 GRAD ENGR         307.    313.    319.    325.    332.    338.    345.    352.
   TOTAL REGULAR FTE  4149.   4263.   4381.   4503.   4628.   4756.   4889.   5025.

 EXTENSION         120.    126.    132.    138.    145.    153.    160.    168.
 SUMMER SCH       1458.   1458.   1458.   1458.   1458.   1458.   1458.   1458.
 MGT CENTER         27.     27.     27.     27.     27.     27.     27.     27.
   ENROLL-TOTAL   5754.   5874.   5999.   6127.   6259.   6394.   6534.   6678.

   ENROLLMENT FACTORS    FTE      FTE GF    TUITION ADJ FACTR
 UNDERGRADUATES       2900.      1.0300      0.9880        PERCENT PROFS        0.2500
 LAW                   264.      1.0200      0.8300        PERCENT ASSOC        0.2500
 GRAD ARTS              92.      1.0500      0.5200        PERCENT ASSISTANTS   0.3600
 GRAD BUSINESS         586.      1.0200      0.4600        PERCENT INSTRUCTORS  0.0400
 GRAD ENGINEER         307.      1.0200      0.6320        PERCENT LECTURERS    0.0700
 EXTENSION             120.      1.0500      0.2470        PERCENT OTHER RANKS  0.0300
 SUMMER SCHOOL        1458.      1.0000      0.0810
 MGT CENTER             27.      1.0000      1.7600

                  DATA USED IN PROJECTIONS
    RES AND GRANT OVERHEAD RATE            0.4200
    TUITION RATE   INCREASE                1.0750
    STUDENT FACULTY RATIO                 15.5000
    STUD-FAC RATIO GF                      1.0000
    FAC SALARY GROWTH RATE                 1.0600
    COMPENSATION PERCENT                   0.0900
    COMPENSATION GROWTH RATE               1.0020
    INSTR SUPPORT GF                       1.1030
    INSTRUCTIONAL SUPPORT PER FTEF      3315.0004
    INIT SS, EXT,MGT C,ROTC EXP       185000.0316
    SS,EXT MC RO GFACTOR                   1.0600
```

Exhibit 40

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PAGE 2   KEY VALUES PROJECTED    RUN NUMBER    114.          7./ 8./1970.

                   1968-69  1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
 NO.PROF               66.      68.       70.       72.       74.       76.       78.       81.
 NO.ASSOC              66.      68.       70.       72.       74.       76.       78.       81.
 NO.ASST.              96.      99.      101.      104.      107.      110.      113.      116.
 NO.INSTR.             10.      11.       11.       11.       11.       12.       12.       12.
 NO.LECT.              18.      19.       19.       20.       20.       21.       22.       22.
 OTHER FACULTY          8.       8.        8.        8.        8.        9.        9.        9.

 AVG SAL PROF       15380.   16302.    17280.    18317.    19416.    20581.    21816.    23125.
 AVG SAL ASSOC      12637.   13395.    14198.    15050.    15953.    16911.    17925.    19001.
 AVG SAL ASST        9984.   10583.    11218.    11891.    12604.    13360.    14162.    15012.
 AVG SAL INSTR       8307.    8805.     9333.     9893.    10487.    11116.    11783.    12490.
 AVG SAL LECT       21000.   22260.    23595.    25011.    26512.    28102.    29788.    31576.
 AVG SAL OTHER      10000.   10600.    11235.    11910.    12624.    13382.    14185.    15036.
 ENROLLMEN-REGULAR   4149.    4263.     4381.     4503.     4628.     4756.     4889.     5025.

 TUITION RATE        1725.    1854.     1993.     2142.     2303.     2476.     2662.     2861.
 FTE FACULTY          267.     275.      282.      290.      298.      306.      315.      324.
 STUD-FAC RATIO   15.5000  15.5000   15.5000   15.5000   15.5000   15.5000   15.5000   15.5000
 TOTAL FAC SAL   3399707. 3703348.  4034228.  4394802.  4787746.  5215979.  5682685.  6191339.
 TOTAL COMP       306585.  333967.   363806.   396323.   431758.   470376.   512464.   558334.
 INSTR SUPPORT    978747. 1005814.  1033660.  1062309.  1091784.  1122111.  1153315.  1185422.
 SS,MGTC,EXT,EXP  185000.  196100.   207865.   220337.   233558.   247571.   262425.   278171.
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Exhibit 41

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PAGE THREE     OPERATING BUDGET   RUN NUMBER    114.           7./ 8./1970.

ACCOUNT     GROWTH F    1968-69   1969-70   1970-71   1971-72   1972-73   1973-74   1974-75   1975-76
TUITION               6700347.  7399489.  8172034.  9025728.  9969138. 11011746. 12164032. 13437596.
ENDOWMENT     1.0250   776701.   796118.   816021.   836421.   857332.   878765.   900734.   923252.
GEN AND DEPT 1.0600    140000.   148400.   157303.   166742.   176746.   187351.   198592.   210508.
AUX ENTRP     1.0240  2950000.  3020800.  3093298.  3167537.  3243557.  3321402.  3401115.  3482742.
GIFT          1.0520  1320000.  1388639.  1460848.  1536812.  1616726.  1700795.  1789236.  1882276.
ORG ACTVT     1.0450   194000.   202729.   211852.   221386.   231348.   241759.   252638.   264006.
RES AND GRTS 0.9600    911600.   875136.   840130.   806525.   774263.   743293.   713561.   685018.
FINANCE AID   1.0600  1136200.  1204372.  1276634.  1353231.  1434425.  1520490.  1611720.  1708423.
    TOTAL INCOME     14128848. 15035684. 16028122. 17114384. 18303536. 19605604. 21031628. 22593820.


                                                  EXPENSE
INSTRUCTION           4870040.  5239231.  5639562.  6073771.  6544847.  7056038.  7610889.  8213266.
GEN ADM EXP   1.0500   456000.   478800.   502739.   527876.   554270.   581984.   611083.   641637.
GEN INSTUT    1.0500   840900.   882945.   927092.   973446.  1022118.  1073224.  1126885.  1183229.
AUX ENTRP     1.0500  2466444.  2589766.  2719254.  2855217.  2997977.  3147876.  3305269.  3470532.
RES AND GRTS           528728.   507578.   487275.   467784.   449073.   431110.   413865.   397310.
PUBLC SERVCE 1.0500    300000.   315000.   330749.   347287.   364651.   382884.   402028.   422129.
STUDNT SERV   1.0500   599000.   628950.   660397.   693417.   728087.   764492.   802716.   842852.
LIBRARIES     1.0500   534000.   560700.   588734.   618171.   649080.   681533.   715610.   751390.
PHYS PLANT    1.0500  1160795.  1218834.  1279776.  1343764.  1410952.  1481500.  1555575.  1633353.
ORG ACTIVITY 1.0500    265000.   278250.   292162.   306770.   322109.   338214.   355125.   372881.
FINAN.   AID 1.0910   1828000.  1994347.  2175833.  2373833.  2589851.  2825526.  3082648.  3363168.
CONTINGENCY  0.0200    276978.   293888.   312071.   331626.   352660.   375287.   399633.   425835.
   TOTAL EXPENSE     14125886. 14988290. 15915648. 16912968. 17985680. 19139672. 20381328. 21717588.

BALANCE                  2962.    47394.   112474.   201416.   317856.   465932.   650300.   876232.
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Exhibit 42

MODELING AND SIMULATION SUMMARY

These are fourteen examples of the use of a model of Nedrap University to try various combinations of planning alternates. While this is not a model of sufficient detail to produce an annual operating budget, it can produce the amounts available to major program categories. These become the constraints on the annual budget. If the budget year shows a surplus, if income levels are achieved, and if expenses in each category are not allowed to exceed the planned value, the plan will be achieved. If there is a need to change one expense category, then a new allocation should be developed. This model was programmed on an IBM 1130, and could be adapted to an IBM 1620 or equivalent size. If an institution organizes its planning activity to the level where this kind of simulation becomes an integral part of long range planning, it will be ready to develop a more precise description.

V SUMMARY

"The tendency is strong in most universities to expand in more directions than available finances make wise. The resulting poverty is shared by all." With these words, Willets and Preston described why program budgeting should be of interest to all colleges and universities.

I PROGRAM BUDGETING--A COMPREHENSIVE APPROACH

Program budgeting provides visibility to the planning, innovation, allocation and evaluation process. It does this by grouping activities by programs whose costs and benefits can be assessed.

Contemporary college and university budgeting prodedures evolved in support of the accounting functions--authorization, control and accountability. These needs continue. Program budgeting adds a cost-benefit dimension to aid in planning and allocation decisions.

The management activity is not clearly defined for colleges and universities. The community of scholars concept does not appear to be compatible with anyone "managing" anyone else. Yet if the efforts of an organization are to be focused, to be anything other than the random expression of individuals, there will need to be an agreement on objectives, and how they are to be achieved. This requires planning and organization of activities so that they be mutally reinforcing. Planning, allocation of available resources, control of their utilization, evaluation of how well goals are achieved, these are the management functions.

Program budgeting is consistent with an open forum and rational discourse. It will not, of course, eliminate conflict over priorities, values, or "best" approaches. Hopefully, it will help to conduct the debate in an orderly fashion.

Program budgeting is a special case of systems analysis. The university and its environment is a system. Each activity or program is considered not only by itself, but also in relation to all of the other activities that make up the university. This is another way of saying that when a decision is to be made, the "total picture" is considered.

Systems analysis can be of most assistance when the decisions are difficult--the objectives are not clear, there are nearly unlimited choices, and the consequence of each are not clearly understood. In these and other situations, the analysis identified with operations research can be most helpful.

This discussion uses the term "decision-maker" to identify the person, or persons, who must ultimately choose one from among a number of alternatives. It can be one person, the concensus of a committee, or even a referendum of all participants. Whether it be one or many participants, each can use additional information in support of his decision.

The program classification proposed by WICHE is an attempt to reach a concensus among colleges and universities. The classifications would serve their own needs, be compatible with national information surveys, and provide a basis for inter-institutional comparisons.

II THE PROGRAM BUDGETING CYCLE

1. A statement of institutional objectives is a description of its role or mission. For a university, it is a description of that share of higher education it seeks to undertake. Goals are quantified intrepretations of objectives to more clearly identify levels of anticipated achievement. It is difficult to establish a comprehensive list of objectives on the initial attempt. Only after many alternatives have been reviewed and the variety of choices available are known, that a complete statement of objectives will evolve. There is a need for a specific statement of objectives and goals so that at a later time, the success with which they are achieved can be evaluated.

2. Objectives and goals are achieved by undertaking activities or programs whose successful achievement will satisfy these goals. For an institution of higher education, this is nearly an unlimited list. A new course, ten more students, an additional faculty member, each will affect one or more programs. Which programs or program elements to undertake, within available resources, is the thrust of program budgeting.

3. Each program, each element or part of a program that is initiated will require resources--faculty and student time, space, facilities, or equipment. There are a variety of programs, and a number of variations on each program, which will satisfy a university goal. The resource implication of each must be developed so that each alternate use of resources can be compared with every other alternate.

4. For each program, or program alternative, there is a potential benefit--an achievement--which is the reason why

the program is being undertaken. While the benefit of every program can be classified in general--that is research, education or public service, a more precise statement of benefits must be developed. The potential worth of each program along with its resource requirements, in comparison with all of the other programs is the information the decision-maker needs when making his allocation decisions.

5. The decision-maker selects that combination of programs which appears to best satisfy the greatest number of institutional goals within available resources. The decision maker can (and often does) make these choices based on experience, intuition, the recommendation of colleagues, and whatever other help is available. Program budgeting seeks to provide additional information, in a more useful and convenient format, which results from a more comprehensive analysis of the problem.

6. The long range fiscal implications of selected alternates are tested to be certain that available resources throughout the next five to ten years are not exceeded. This could be a manual accumulation of anticipated income and expenses, or a simulation using a computer.

7. The annual budget is developed from the information obtained from the long range projections for the current year. The budget could be expressed by organizational units, by programs , by both, or in combination.

8. The evaluation activity follows the implementation of the selected programs. It includes the conventional control of resources. But more importantly, it asks whether or not

anticipated benefits were realized. This knowledge will influence subsequent allocative choices, will support a review of goals and objectives, and will change the priority rankings of alternatives.

9. The costs of all programs are recorded as part of the evaluation activity. These are accumulated as "standard data" to be used in the future, for assessing other proposed programs.

10. The planning-programming-budgeting-evaluation cycle repeats on a continuous basis. The more complicated the procedure, the more time will be required to keep the program budgeting documentation current. If it is updated only once a year, in time for preparing the annual budget, program budgeting will not become an integral part of the administration of the university.

III PROGRAM BUDGETING AND THE ORGANIZATION

A self study is a comprehensive, introspective analysis of an institution. Where it has been, where it is now, where it would like to be is the subject matter. A "master plan" is the normal end product. This is a good way to initiate program budgeting. After that, the process will be a continuous one.

Program budgeting proposes that the costs and benefits of every program be compared to those of every other program on a continuing basis. An existing program does not automatically have priority over all new proposals. This will contribute significantly to the resistance to adoption of program budgeting.

No one underestimates the difficulty of assessing the benefits of a particular program. The consequences of one choice in favor of another are often evasive. These nuances are the dimension the decision-maker contributes. Program budgeting requires only that the best possible assessment of benefits be attempted. They are naturally open to question. Resistance to program budgeting will be offered on the basis that benefit analysis is too difficult. There is no evidence that a lack of analysis is preferable.

Some administrators will resist using program budgeting as a systematic approach to problem solution. As long as they can "play it by ear," their mistakes are more easily rationalized. As situations grow more complex, any assistance will be of value.

Program budgeting is not an activity limited to universities with a large computer and a substantial staff for analytical studies. The procedure can be geared to the size of the institution because the smaller unit generally has a less complex operation, and considerable shorter lines of communication. The program budgeting procedure will prove equally informative to the smaller institution.

Currently, there is a significant activity seeking to develop management information systems in support of decision-making. It appears that these systems will be developed long before there is a comparable understanding of the decision-making process in colleges and universities.

A management information system seeks not only to supply the necessary information to support program budgeting, but to also satisfy the information needs of day to day operations.

Management information systems should not be developed before optimal operational procedures are developed and recorded. Few institutions have the patience to wait. This is why the cost of implementing data processing installations has been so high--the cost of reprogramming changing procedures is rarely anticipated.

The decision-makers, and the staff who work in support of the decision-making-functions, must develop a sustained communication. The decision-maker cannot abdicate his responsibility to the staff members. The staff assistance must be pertinent, helpful, and timely.

IV MODELING AND SIMULATION

A model of a college or university is a quantified expression which attempts to relate the pattern of cause and effect for use in predicting decision consequence.

To build a model of a university requires a detailed knowledge of all of its processes and their inter-relations. This exploratory knowledge will be very helpful in understanding the current operations, justifying the effort expended even if the model is used only to test long range projections.

A relatively simple model is an excellent training device to display the impact of particular decisions or choices. The model can be made increasingly sophisticated provided that by doing so, it is not isolated from the decision-making process.

And finally, there are diminishing returns to program budgeting. The cost of management information systems is considerable. An analytical staff may do analysis with no one listening. There is a need to arrive at reasonable levels of data collection and analysis, and to insure that the information they provide is making a genuine contribution to university decision-making. Without this contribution to more effective management, it will not become a justifiable university activity.

APPENDIX A

TOPICS FOR INCLUSION IN A SELF-STUDY

A SUMMARY OF THE LONG-RANGE PLAN

- Objectives of the institution
- Goals to be achieved
- Academic program status and aspirations
- The Faculty
- Student life
- Academic services
- Organization and finance
- Administrative services
- Campus and facilities

THE STATE OF THE UNIVERSITY

- A brief history
- Its mission in higher education
- Enrollment and other statistics
- The Faculty
- Corporate and administrative organization
- Physical plant
- Current fiscal position

THE OBJECTIVES AND GOALS OF THE UNIVERSITY

- The uses for a statement of purpose
    - Institutional philosophy
    - Objectives
    - Aspirations
- Institutional philosophy
    - Social Contribution
    - Caliber of the student body
    - Financial aid opportunities
    - General Educational Goals
        - Undergraduate
        - Graduate
    - Caliber of the faculty
    - Communities to be served
    - Control and self direction of the institution
- Institutional goals
    - Admissions
    - Scholarships
    - Size of the enrollment
    - Financial Support

THE PROGRAMS OF THE COLLEGES AND SCHOOLS

- Objectives
    - Student goals
    - Institutional goals
- Administration
- Students
    - Orientation to college objectives
    - Enrollment by majors
    - Persistence, probation, dismissal, reinstatement
    - Counselling
    - Transfers
- Faculty
    - Formal Personal Education
- Curriculum and Instruction
    - Scope of programs
        - Undergraduate
        - Graduate
    - Enrollment levels in each program
        - Number of courses offered
    - Quality of instruction
        - Distribution of grades
        - Honors and awards
    - Program status
        - Proposed
        - To be discontinued
- Special Programs
    - Honors
    - Studies abroad
    - Summer School
    - Intra-University activities
    - Cooperation with other institutions
- Research, Scholarly, and Creative Activity
    - Faculty
    - Students
- Public Service
    - Institutes
    - Conferences
- Status, goals, priorities

THE FACULTY

- Composition
    - Full-time
    - Part-time
    - Distribution by rank
- Faculty-student ratio
- Work Loads
    - Instruction
    - Research
- Compensation
    - History
    - Goals
- Organization
    - In the university structure
    - Committee membership
    - Faculty organization
    - Faculty Handbook
- Recruitment
- Selection
- Promotion
- Development
    - Sabbaticals
    - Leaves
    - In-service training

STUDENT LIFE

- Government
    - Organization
    - Finances
- Discipline
    - Judicial system
- Religious Life
- Housing
- Publications
- Athletics
    - Intramural
    - Inter-collegiate
- Health Services
- Social activities and facilities

ACADEMIC SERVICES

- Library
    - Staff
    - Facilities
    - Services
    - Budget
- Computational Center
    - Staff
    - Facilities
    - Equipment
    - Services
- Registrar
    - Scheduling
    - Registration
    - Grade Recording
- Admissions
    - Policies
        - Freshmen
        - Transfers
    - Recruitment
        - Graduate
- Publications
- Financial Aid
    - Staff
    - Programs
    - Funds
- Office and clerical services
    - Mail
    - Secretarial
    - Reproduction
- Data Processing services
    - Schedules
    - Procedures
- Development
- Public Relations
    - Alumni
    - Community
- Plant Operations and Maintenance
- Personnel

CAMPUS AND FACILITIES

- Campus Planning
- Academic Facilities
    - Building
    - Classrooms
    - Laboratories
    - Research space
    - Equipment
    - Library
    - Offices
- Student residences and services
    - Dormitories
    - Student Union
    - Theatre
    - Gymnasium
    - Playing fields

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IMPLEMENTING A LONG RANGE PLANNING ACTIVITY AT THE UNIVERSITY OF HOUSTON

by Douglas MacLean, Vice President for
Academic Services, University of Houston

Before describing the implementation of a formal long range planning process at the University of Houston, I would like to review the premises which influenced the development of our planning activity:

1. First, no institution has limitless resources. This means that if the institution is to achieve what others with greater resources achieve, the process for the management of resources must be superior. Such a process does not require rigid control or the stifling of initiative, but it does demand imaginative, skillful management. It requires the development of plans and of planning processes by which the human, statistical, financial and intangible elements of the educational environment can be brought into optimal relationships. This, then, is the purpose of planning.

2. A second consideration is the recognition that the success of any plan depends on its capacity to meet human requirements. Effective planning is participatory planning and requires the development of a process which can cope with the human problems of the organization.

3. To be successful, planning must be done in terms of both time and state of development. Day-to-day planning and operation are effective when long-range goals

and short-range objectives are known to everyone. It is therefore a continuous process with strong provisions for feedback among the various organizational levels involved. Exhibit 1 graphically displays this long and short range relationship. Short-range budget considerations give no assurance that long-range goals or objectives can be attained. Similarly, one-year budgets mask the total cost of a plan of action that may extend over a five, ten, or thirty year time span. The concept of multi-year planning recognizes that operating income projections, and operating control, demand annual budgets developed in detail. Facilities to accommodate programs take from three to five years to accomplish, and these facilities will be in use and will be paid for over a period of thirty to forty years.

4. While the planning process needs to be structured, guided and directed, it should respect and be sensitive to existing organizational conditions and values. This requires that great emphasis be placed on the effectiveness of communication about the planning process, and the goals, objectives, plans and priorities that are derived from it.

5. The principal thrust in the planning process must center on the academic programs so that the goals, objectives, priorities and needs of these programs are considered first and foremost in both planning and budgeting. The workload of the administrative, service and auxiliary departments derives from that of the academic programs, and this factor should be recognized in the structure, timing and emphasis of the planning process itself.

6. Hundreds of years ago, someone said: "There is nothing more difficult to take in hand, more perilous to conduct,

MULTIPLE YEAR PLANNING

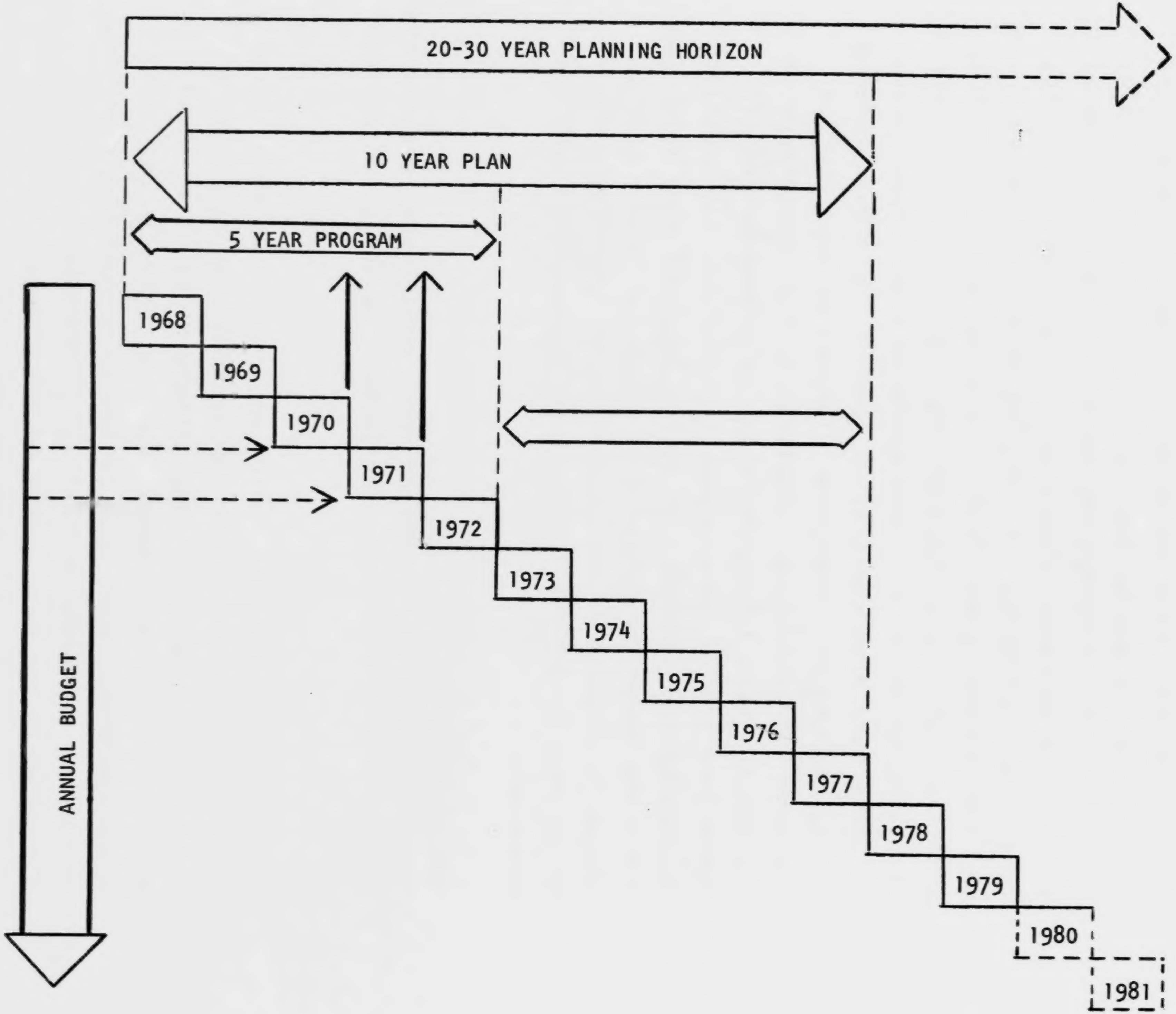


Exhibit 1

more uncertain in its success, than to take the lead in the introduction to a new order of things." The writer was Machiavelli and he was right. However, the introduction of a new order of things has become viewed as "Machiavellian" which has a different flavor to it altogether. Planning creates anti-planning. A new plan always challenges those who derive their power from the old one and the result is a backlash which all planners fear and which good planners strive to avoid, or at least minimize. Resistance stems in large part from the fear of loss of individual freedom and of the end of independent planning by separate disciplines and activities. Implicit in this resistance is the feeling that independence can be preserved only if operations remain too complex, too obscure, for organized evaluation and control. It is now apparent that spiraling costs and sheer inefficiency of operation pose a greater threat to freedom of action than do the exposure of operating details and the loss of some degree of control over resources.

THE ANNUAL PLANNING CYCLE

The annual planning-budgeting cycle begins when program and sub-program offices begin development of the planning documents.

The second stage is the review and consolidation of these documents, a time when the top brass of the institution engage in extensive dialogue (otherwise known as "head knocking") with those people who are trying to get their plans approved. When this review is completed,a reporting session is conducted so that all persons who have participated in the development of the planning documents may see the combined results of their efforts and the implications for total resources at the end of that stage of planning.

Work then begins on the third major stage, the analysis of the plans and the beginning of decision-making based on them. This stage may include budget hearings in which the program administrator has an opportunity to discuss major goals and objectives, areas of emphasis and priorities so that the next budget may be compiled as a reflection of institutional plans and programs.

The next stage is budgeting, the specific financial translation of program plans into dollars for a single fiscal year.

The last stage is the further analysis and review of the total plan and the resulting budget for their implications on the next cycle of planning and budgeting.

I want to emphasize that, during this cycle, several opportunities are provided for feedback among the major participants in the process as the planning and budgeting documents move back and forth.

WORK MEASUREMENT IN NON-ACADEMIC DEPARTMENTS

The administrative and service departments are not exempt from critical evaluation either. The academic departments have become accustomed to being evaluated on a unit workload basis such as the student credit-hour or headcount enrollment. These workload units generally are not suitable for the workload of administrative and service departments. Types of workload measurement units which we have found useful would include, for example, the number of purchase orders processed in the Purchasing Department. Similarly in the fund-raising area, the dollars raised in a given period seems to hit the nail on the head. In building maintenance, the square feet of the buildings maintained appears to be as good a measure as any. In the Bookstore the measure could be gross sales. I know of one institution that studied workload measurement units for three years before starting to do any planning. We devoted about two hours to the idea one afternoon and told the departments that they could either use the workload measurement units that we suggested or come up with their own, but that they should get with it.

OBJECTIVES OF THE PLANNING PROCESS

In February 1969, the University of Houston completed its first academic planning cycle. Having once gone through the process and accumulated a large amount of data, we feel that a planning process should yield at least nine specific outputs.

1. One of the primary objectives of any academic plan should be to establish overall institutional objectives which will serve as a basis for making future major decisions. When we speak of overall objectives, we mean objectives such as: The University will (or won't) place maximum educational emphasis upon programs in Business, Engineering, Law, Pharmacy and Optometry. The University will offer, but not attempt to excel in, speech, art, music, etc. The University will remain a commuter type University. The University will maintain its present day-night mix and offer certain night programs to serve the working community of the Greater Houston area. The University will remain a school for full-time and part-time students in

order to serve the Greater Houston area. The University will control enrollment in each major area; for example, 4,000 undergraduates in the College of Business, 2,000 undergraduates in Fine Arts, and so on.

2. It should establish program priorities. Once the objectives have been established, priorities among the existing programs and new programs can be determined. The planning data used to establish objectives and priorities will also indicate which program requirements should be satisfied first, second, third, etc. For example, if the Business Program is given priority over the Fine Arts Program, the new faculty and other requirements to maintain quality in Business will be largely satisfied before the Fine Arts Program is allowed to develop a new Ph.D. area of study.

3. A plan should provide a basis for determining all resource needs, such as manpower, space and dollar requirements, for each operating level within the University.

4. A planning process should provide a basis for making tradeoffs. Once the overall objectives and program priorities have been established, the supporting planning data should enable the decision-makers to tradeoff the resource requirements of one major program in order to enhance the development of another program. For example, perhaps by postponing a Ph.D. area of study in one of the lesser emphasized areas, a new Ph.D. area of study could be started this year in a higher priority area.

5. The planning process should provide a basis for resource allocation. Once the institution knows where it is going,

in terms of its objectives; has priorities established among the various programs; and understands the feasibility of program tradeoffs, then allocation of resources becomes less traumatic as the plans are implemented by way of the annual budgeting process.

6. Communication and feedback should be enhanced. The planning process should encourage the faculty and professional staff to participate in the process.

7. Extra-University communications can be increased. Once the academic plan is developed, it can serve as an excellent resource for communications with the Board of Regents, the State Legislature, major donors, alumni and the general public.

8. The planning process should provide a framework for interim management decisions. Any planning process, which is conscientiously developed, will yield information which will provide a framework for management decisions at all levels within the organization. The first year's effort at planning will reveal data which will indicate to a dean or chairman the number of faculty that need to be hired, etc. From the planning process will also come data indicating faculty ideas on new areas of study and new degree programs. Eventually, as the planning process becomes more sophisticated, data will be produced which will guide most management decisions.

9. And finally, any planning process should result in an approved set of directions which can be used to guide future decisions. The planning process should be so structured that each year updating the process can become

more automated and thus allow more time for analysis, reflection, and decision making.

DEVELOPING THE ACADEMIC PLAN

The first step that we took at the University of Houston in developing our academic plan, was to secure the endorsement of top management to initiate a continuous planning process. We obviously did not want to spend a great deal of time developing a planning process, planning documents, historical data, etc., unless we had the commitment of top management to initiate and perpetuate a planning process.

The next step taken was to develop some basic definitions and a program structure that could be accepted by the entire academic community and used as guidelines for completing the planning documents.

The basic planning unit is the "program" which refers to a major grouping of departments which are sufficiently similar in purpose, scope and operation to justify their consideration together as one major part of a program area.

Using this definition, we came up with about 50 programs. This number was too great to comprehend or deal with together. Another summary level was needed. This summary level is the program area which refers to a broad grouping of programs which are sufficiently similar to justify their consideration together as one major endeavor of the institution.

Using these definitions, six program areas were developed to include all departments in the University.

Resident Instruction Program Area includes all the budget categories directly associated with instruction plus a few others such as Radio-TV Operations, TV Film Operations, Swimming Pool, Animal Care Operations, the Audio-Visual Center, a total of sixteen.

The Organized Research Program Area includes all the operating budget categories associated with research such as the Office of Research, the Office of Research Accounting, Center for Human Resources, Institute for Urban Studies and a few others.

The Library Program Area includes the main library and departmental libraries.

The General Support Program Area includes all the expense associated with general administration, general institutional expense, plus those expenses incurred in Physical Plant Operations.

The Extension and Public Service Program Area includes all the budget categories associated with public service functions such as the Management Development Center, Personnel Psychology Services Center and a few others.

PILOT TESTING

Before the academic planning documents were distributed to the department chairmen, they were pilot tested in three areas, Biology, Optometry and English. The results of the pilot test were integrated into the final documents before distribution. This pilot test allowed us to detect some of our errors before we requested the entire University to complete the documents. After the pilot test, the planning documents were presented to the vice presidents and deans for their approval and to insure their cooperation in completing the documents.

SCHEDULE OF TIME REQUIREMENTS AND RESPONSIBILITIES

A flow path was developed which indicated when each major step of the planning cycle was to be initiated, who had the responsibility for initiation, and when each step was to be completed. For example, the deans and the vice presidents were to be oriented to the process on a certain date. Documents were to be delivered to the department chairmen and meetings with the department chairmen were to be held on certain dates. The documents were to be completed and back in the dean's office by certain dates. The deans were to have the documents reviewed and in the Vice President's Office by X date. Such a flow path is critical for any academic planning process.

At the same time that the Office of Institutional Studies was orienting the vice presidents, deans and department chairmen to the planning process. The Registrar was preparing headcount enrollment and student credit-hour projections for each academic program for each year of the planning period. These projections were given to the Budget Director to serve as the basis for projecting income for each year of the planning period. The workload data for each department, however, was prepared by the department chairmen, i.e., the department chairman made his own headcount enrollment projection, projected his own student credit hours, the number of degrees that his department would be awarding, etc. This allowed the departments to assume any guidelines they thought reasonable in making their projections. The initial approach to establishing departmental course enrollments and workload was completely unstructured.

The Office of Institutional Studies had prepared historical data on the headcount enrollment and student credit-hours for each academic department. They met with each dean and each department chairman and explained the historical data and assisted, when asked, in projecting the workload for each department. Most of the assistance given by the OIS staff was related to the planning process and not to the actual planning data.

Once the department chairmen completed their documents, they submitted them to their deans for review and comment. However, one of our ground rules on this first cycle was that the dean would not arbitrarily change any of the data that the department chairmen had included in their documents. The deans often made comments as to the validity and realism of some of the numbers. However, they did not unilaterally change the projections that the departments had made.

Once the deans had made their comments, the completed documents were sent to the Office of Institutional Studies for review and editing. The OIS staff on many occasions had to contact the departments to clarify points. However, after some editing the OIS staff sent the documents to the supporting areas, including the Library, Computing Center, Office of Research and the Office of Facilities Planning and Construction. These offices analyzed the particular resource requirement for each department and prepared a report indicating the resource implications of these requests. The Computing Center likewise analyzed all of the computing requirements of the total University and prepared a summary report. The Office of Facilities Planning and Construction performed a similar function with respect to capital requirements.

Once all the documents were received from the departments and the supporting areas, the Office of Institutional Studies analyzed the data and prepared the Preliminary Summary of the data to the deans, general faculty and Board of Regents followed the publication of that report.

FEEDBACK ABOUT THE PLANNING PROCESS

After the presentation of the planning data, the Office of Institutional Studies critically reviewed the planning process, and requested feedback from the deans and associate deans on ways to improve it. We received destructive and constructive criticism about the planning process. Most of this has been conscientiously integrated into the 1969-70 cycle. Each year we expect to improve our planning capability. The Preliminary Summary of Five Year Planning Data report was prepared as a result of the planning process. This report, with its cold-blooded statistics, was developed to spur discussion and to supplement the non-quantifiable information already available. We did not intend it to make decisions for us and sure enough, it hasn't.

CONTENT OF THE FIVE YEAR PLANNING DATA REPORT

Typical of the charts that were included in the report, was an estimate of headcount enrollment by level of instruction made independently by the Office of the Registrar and by the academic departments for the period 1969-73. In total, the combined departmental estimates exceed the

Registrar's estimates in each year of the planning period. By the fifth year of the planning period, 1973-74, the combined departmental estimates would produce a total headcount enrollment of 41,064, compared to the Registrar's estimate of 35,772, a difference of 14.8 per cent.

Another table included was the per cent of total degrees awarded by program and level in 1967-68 and projected by the department for 1973-74. This comparison indicated shifts in the distribution of degrees awarded among programs at all levels during the planning period. Budiness Administration showed a slight decline in the per cent of total degrees awarded at the undergraduate level and major increases at the graduate level. The greatest overall increase at all degree levels was shown by Math and Sciences. A large part of this surge may be contributed to the growth in Computer Science. Another visible shift occurs in Liberal Arts, which shows a decrease in the per cent of total degrees awarded at all levels, and especially at the Masters and Doctoral levels.

The statistical data gathered on each academic program were summarized in a format which highlighted certain key items. For example, headcount enrollment and student credit hours by level are displayed for the present year and for each year of the planning period. Full-time, part-time and full-time equivalent faculty are also displayed along with operating budget requirements, capital improvement requirements, library requirements, computing requirements, average class size and equipment expenditures. Certain teaching load ratios and cost ratios were also calculated for each academic program. Growth indices for each one of these items was projected. For example, the growth rate between years +1 and +2 was calculated for headcount enrollment, student credit hours, faculty, etc., as shown in Exhibit 2.

Accompanying each statistical page, was a narrative explanation of each program within Resident Instruction, and for each program area other than Resident Instruction. For example, in the Graduate School of Social Work, a narrative explanation accompanied the statistical page and highlighted the demand for the teaching activity, the objectives of the program, the image of the program, the teaching methods, human resources, financial resources, space, library, computer research.

For each of the six program areas, the current budget operations and the total operating requirements were projected for the fifth year of the planning period. The greatest dollar demand over the next five years, in the six program areas, is in Resident Instruction, which projects an increase of 165.5 per cent. Much of this demand can be attributed to the extremely high workload estimates made by the departments.

The fallacy of independent department workload estimates become obvious with a comparison of the per cent of total Resident Instruction requirements by program for 1968-69 and for 1973-74. The relative change in emphasis given each program, as measured by the resources required to support its operations, became apparent. At the present time the University gives greatest resource emphasis to Liberal Arts which requires 23.4 per cent of total Resident Instruction resources. The next largest program in terms

ORGANIZED RESEARCH PROGRAM AREA

ITEM	PROJECTED RESEARCH REQUIREMENTS						GROWTH INDICES (Present Year = 100)				
	Present	+1	+2	+3	+4	+5	+1	+2	+3	+4	+5
Staffing:											
Professional	10.5	16.5	20.0	22.0	26.0	26.0	157	190	210	248	248
Total FTE Staff	20.8	36.3	46.8	52.0	61.5	63.0	175	225	250	296	303
Operating Budget Requirements:											
Salaries	$261,021	$452,832	$530,757	$582,953	$684,938	$744,159	173	203	223	262	285
All Other	182,360	218,050	175,270	216,920	211,195	252,220	120	96	119	116	138
Total	443,381	$670,882	706,027	799,873	896,133	996,379	151	159	180	202	225
Capital Improvement Requirements			See Capital Requirements Summary								
Computing Requirement	$ 450	$ 3,625	$ 5,448	$ 6,738	$ 8,275	$ 8,884	805	1210	1497	1838	1976
Cost Ratios:											
Salary Cost per FTE Staff	$ 12,549	$ 12,475	$ 11,341	$ 11,211	$11,137	$ 11,812	99	90	89	89	94
Total Cost per FTE Staff	$ 21,316	$ 18,482	$ 15,086	$ 15,382	$14,571	$ 15,816	87	71	72	68	74

Exhibit 2

of resources is Mathematics and Sciences which takes 17.7 per cent of the operating resources. Engineering requires 14.8 per cent. These three programs together consume 55.9 per cent of the total resources available for Resident Instruction operations. If all the departmental requests were to be met, there would be a substantial change in the relative emphasis among programs. Math and Sciences would take over as the program receiving the greatest support with 21.6 per cent. Business would move from fourth to third, requiring 11.6 per cent. Engineering would drop from third to fourth at 11.0 per cent.

The report included the overall space needs over the five year period by type of space, i.e., general classrooms, teaching laboratories, faculty offices, research, and special purpose and administrative. This includes the currently existing space and the additional net square feet required in each major category. The special purpose and administrative space category is the largest single category in terms of existing space and needed space; this category comprises 46 per cent of the total space needed over the planning period. General classroom needs account for 23 per cent of the total space needed over the five year period. Departmental estimates of workload tend to overstate the true need for classrooms, teaching labs, faculty offices and research space.

The five year cumulative operating requirements for all program areas, and the estimated income to meet those requirements was displayed in the report. See Exhibit three. When the Budget Officer saw this one, he became light-headed and faint. Income was projected on a "most probable" and a "best possible" basis. What we have done

TOTAL FIVE-YEAR EDUCATIONAL AND GENERAL OPERATING AND CAPITAL REQUIREMENTS BY PROGRAM AREA AND PROGRAM - 1969-70 THROUGH 1973-74

	OPERATING REQUIREMENTS			(2)	COMBINED	PERCENT
PROGRAM AREA/PROGRAM	DIRECT	TOTAL (1)	PERCENT OF TOTAL	CAPITAL REQUIREMENTS	TOTAL REQUIREMENTS	OF TOTAL REQUIREMENTS
RESIDENT INSTRUCTION:						
Architecture	$ 3,036,208	$ 3,241,890	1.4%	$ 299,520	$ 3,541,410	1.3%
Business Admin.	17,921,491	21,603,488	9.2	Funded	21,603,488	7.6
Downtown School	524,749	524,749	0.2	-0-	524,749	0.2
Education	15,975,706	16,918,435	7.2	Funded	16,918,435	5.9
Engineering	18,439,980	22,147,214	9.4	7,008,200	29,155,414	10.2
Fine Arts	7,502,655	7,787,783	3.3	3,806,400	11,594,183	4.1
Graduate School	965,637	965,637	0.4	Funded	965,637	0.3
Hotel & Restaurant Mgmt.	693,625	698,625	0.3	(5)	698,625	0.2
Law	4,672,770	7,824,523	3.3	3,302,000	11,126,523	3.9
Liberal Arts	33,516,989	36,257,325	15.4	1,528,520	37,785,845	13.2
Optometry	3,754,739	3,832,295	1.6	3,576,480	7,408,775	2.6
Organized Activities	8,449,421	8,449,421	3.6	5,051,320	13,500,741	4.7
Math & Sciences	32,915,485	38,194,312	16.3	7,433,400	45,627,712	16.0
Pharmacy	1,920,158	2,466,822	1.1	2,440,400	4,907,222	1.7
Social Work	3,664,887	3,694,661	1.6	Funded	3,694,661	1.3
Technology	2,590,547	2,632,018	1.1	900,000	3,532,018	1.2
ORGANIZED RESEARCH	(3)	4,102,274	1.7	297,000	4,399,274	1.5
EXTENSION & PUBLIC SERVICE	2,199,790	2,199,790	0.9	5,024,000 (5)	7,223,790	2.5
LIBRARY	(4)	8,189,724	3.5	1,440,000	9,629,724	3.4
GENERAL SUPPORT	40,911,978	43,014,248	18.3	8,328,720 (6)	51,342,968	18.0
TOTALS	$199,656,815	$234,745,234	100.0%	$50,435,960	$285,181,194	100.0

(1) Includes Direct Operating plus Library, Research, and Computing Requirements.
(2) Excludes Clear Lake Graduate Center ($3,000,000)
(3) Direct Operating Requirements combined with all other UH funded research in Total column.
(4) Direct Operating requirements combined with all other Library in Total column.
(5) Hotel and Restaurant Management included in Continuing Education Center.
(6) General classroom space included in General Support.

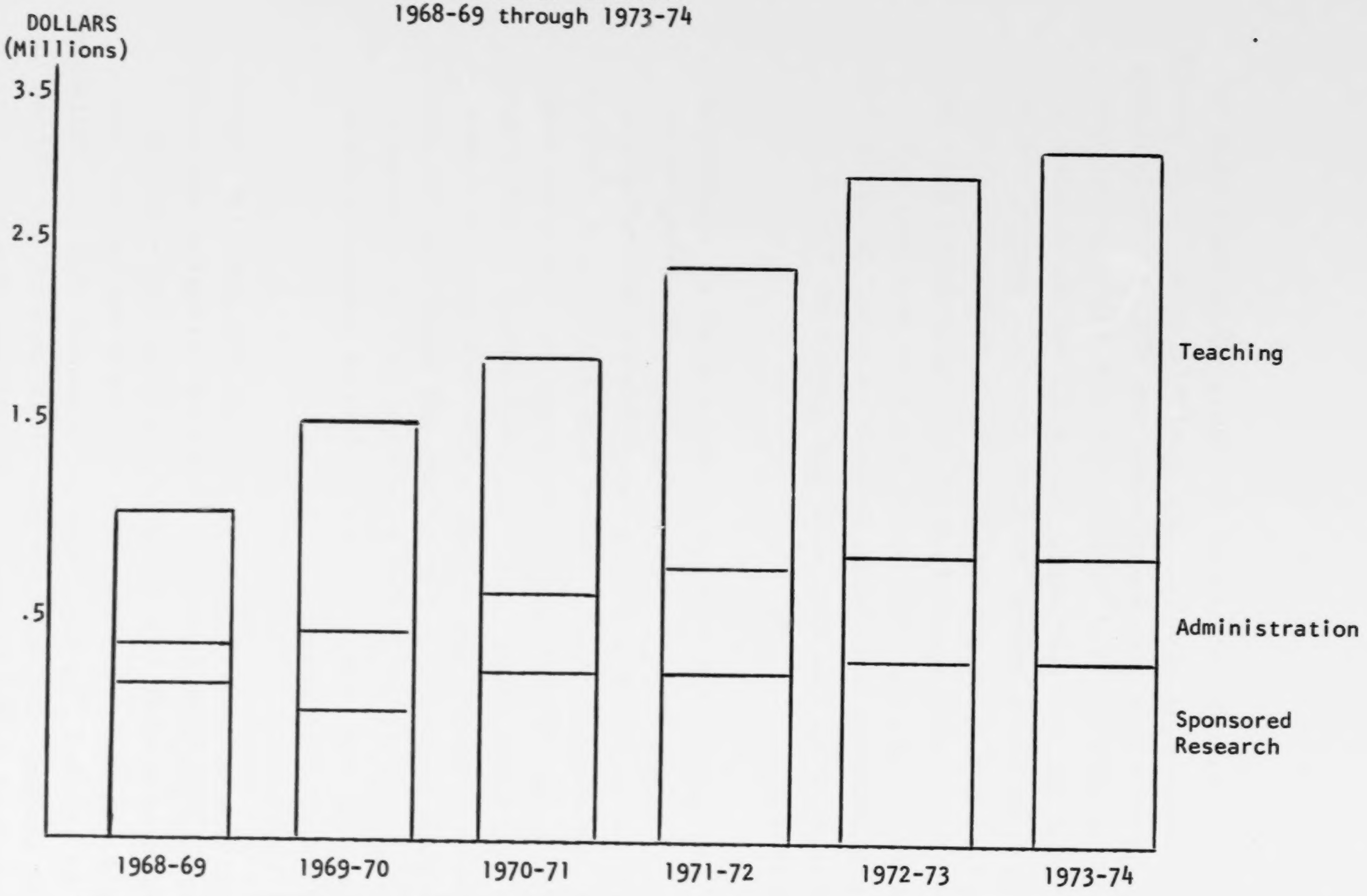
Exhibit 3

is to try to figure out where the money would come from to support these requirements. The analysis shows that, if all the requirements of the departments are met, the University is going to have to find between $82 and $88 million more that anyone can now identify. You will not be shocked to learn that we don't expect to find the full amount. What this analysis did for us was to make it abundantly clear that the hopes and aspirations of the departments must be brought back into the real world and that workload and other requirements are going to have to give, in order for the University to function with any degree of fiscal responsibility.

In the implementation section of the report we summarized the observations made on the basic data and attempted to identify major short and long-range issues deserving top administrative attention. Under each issue identified in the report, we briefly stated the problem, indicated some of the pertinent facts, and then recommended action steps to resolve the problems. Each action statement included the offices responsible for action and deadlines for submission of solutions to the President or vice presidents. Exhibit 4 is one such example--projected computing needs for the next five years.

The short-range issues that we felt needed immediate administrative attention included, workload estimates and control. We pointed out that the disparity between the workload estimates of the Registrar, and the departments, was too great to ignore. We therefore recommended that the Registrar and the academic deans, with the assistance of the Office of Institutional Studies, immediately address themselves to reconciling the enrollment projections.

PROJECTED TOTAL COMPUTER REQUIREMENTS FOR TEACHING, ADMINISTRATION and SPONSORED RESEARCH
1968-69 through 1973-74



	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
Total Requirements	$1,180,640	$1,679,300	$2,098,400	$2,483,900	$2,951,050	$3,169,400
Teaching	685,898	1,150,670	1,366,050	1,631,850	1,970,505	2,104,430
Administration	183,742	308,630	392,350	452,050	520,545	564,970
Sponsored Research	311,000	220,000	340,000	400,000	460,000	500,000

Exhibit 4

Following publication of the report and presentation of the data, several meetings were held with the deans and with the associate deans to discuss the progress on some of the issues. Following these meetings, a status report was given to the faculty indicating the current status of each one of the issues identified in the implementation section of the report.

You will recall that at the beginning of the presentation "Desirable Objectives of an Academic Planning Process" were outlined. I pointed out that we felt that a planning process should accomplish at least nine specific objectives. How successful were we?

OBJECTIVES ACCOMPLISHED BY THE 1968-69 U OF H PLANNING CYCLE

1. TWO-WAY COMMUNICATION

One of the best products of the 1968-69 planning data was the upward communication that the deans, the vice presidents and the administrators of the University received from the faculty members. The faculty members were formally encouraged to let their hopes and aspirations be known to the decision makers of the University. In return, the administration summarized and analyzed all of the faculty's hopes and aspirations and reported bact to the faculty via several meetings. The vast amount of data that flowed from the faculty members to the administration concerning their hopes and aspirations committed the administration to analysis and decisions and feedback to all faculty members. As a result, in the implementation section of the report, we identified short and long-range decisions which must be dealt with immediately. Some of the decision areas were on workload estimates and control policies, how to reduce total requirements, what will be our ratio of day-night and part-time students, will we allow any departmental libraries, and if so, which departments will get the libraries first.

2. PROVIDED A BASIS FOR DETERMINING ALL RESOURCE NEEDS BY DEPARTMENT, PROGRAM AND PROGRAM AREA

By allowing the department chairmen to estimate their workload in an unstructured manner, we feel that we got a good estimate of what the resource requirements were for each department in order to satisfy their aspirations. In many cases, the total requirements were completely unrealistic, but nevertheless, we now know what they believe it would take to satisfy them.

3. PROVIDED, TO A LIMITED EXTENT, A BASIS FOR RESOURCE ALLOCATION AMONG THE VARIOUS ACADEMIC PROGRAMS

Since our planning cycle started late and produced more questions than answers, it was not possible to link planning and budgeting and thus allocate our immediate resources to implement our plans. However, our planning data were used to a limited extent to assist in the 1969-70 budgeting process. For example, budget hearings were held with each academic dean to discuss how his first year planning would effect his 1969-70 budget requests. We asked each dean to consider ways of reducing expenses, to identify the most critical budget needs and to identify how he would accomplish or modify the objectives presented in the planning documents with limited resources.

4. PROVIDED, TO A LIMITED EXTENT, A BASIS FOR EXTRA-UNIVERSITY COMMUNICATIONS

Because we did summarize the five year data into a manageable form, it did serve as a basis for communicating with our

Board of Regents, faculty and staff, visiting professors, visiting institutional studies staff, etc. The report is a working tool, not a plan.

5. PROVIDED, TO A LIMITED EXTENT A FRAMEWORK FOR INTERIM MANAGEMENT DECISIONS

By goint to the department level to collect basic planning data, information was gathered which was essential to the deans in managing their colleges. For the first time, deans received formal written statements from the departments tying aspirations to resources. Such detailed information is necessary for college level planning and therefore formed a strong framework for management decisions at the college and department levels. However, in attempting to summarize 154 individual documents, which did not necessarily represent the combined desires of the dean and his faculty, we found that the totals were not necessarily realistic and could therefore not materially aid the decision process at the University level.

OBJECTIVES NOT ACCOMPLISHED BY THE 1968-69 U OF H PLANNING CYCLE

1. THE PLANNING PROCESS DID NOT PROVIDE A BASIS FOR MAKING TRADE-OFFS BETWEEN MAJOR ACADEMIC PROGRAMS

It was not possible to analyze trade-offs between major academic programs because we ended up with 154 individual documents. It is impossible to analyze trade-offs between that many departments. In order to overcome this in our 1969-70 process, we are consolidating our department documents into program level documents. This means that from the College of Business, for example, we will receive one program level document instead of a document from each individual department. The one document received is to represent the composite attitudes of the faculty and the dean. As a result, decision makers of the University will have 16 academic programs in which to analyze possible trade-offs in order to accomplish University objectives.

2. THE PLANNING PROCESS DID NOT PROVIDE A BASIS FOR ESTABLISHING UNIVERSITY OBJECTIVES WHICH INTEGRATED STUDENT AND SOCIETAL DEMANDS

Because we ended up with so many documents, with unrelated objective statements, it was impractical to attempt to glean specific objectives which could be applied to the total University. Also, in our first planning cycle, we made no attempt to analyze society's demands for our graduates. Without this input, it would have been impossible for the University to state operationally measurable objectives. For this year's planning cycle, we have undertaken a study to determine the demand in the Greater Houston area, for our graduates. Societal demand probably will influence, but not control, workload decisions.

3. THE PLANNING PROCESS DID NOT PROVIDE A BASIS FOR ESTABLISHING PROGRAM PRIORITIES BETWEEN EXISTING AND NEW PROGRAMS

Because University objectives were not established in operationally measurable terms, and because we had 154 documents to deal with, it was impossible to establish program priorities. In order to intelligently make such decisions, the human impact of such decisions and the resource requirements to accomplish these priorities must be melted together and we must have a qualitative appraisal.

4. THE PLANNING PROCESS DID NOT RESULT IN AN APPROVED ACADEMIC PLAN WHICH COULD BE UPDATED ANNUALLY

Obviously, based upon the foregoing shortcomings, it was not possible to bring the data into an approved academic plan. During the 1969-70 cycle, however, we will come much closer to developing a plan which can be approved by the University decision makers. We have moved to a program level document, and we are also analyzing quality and also societal demands for our graduates. In addition, the Office of Institutional Studies has developed headcount and student credit hour projections for each year of the planning periods. We will eliminate more of the "pie in the sky" which we received from our first process. As a result, the resource needs that we get will be much more realistic and because we will only have documents to contend with this time, it will be possible to analyze program trade-offs. In addition, the Office of Institutional Studies has developed a computer program which projects headcount enrollment and student credit hours (direct and induced) by program and by area of study within the program. The program will also project State appropriation income. This computer approach to planning will provide the Office of Institutional Studies with a technique for monitoring the projections made by the departments and the deans. This also will enable us to keep the "pie in the sky" out of the program projections.

CHANGES IN THE 1969-70 CYCLE

What are the major changes that have been made in the second cycle of planning at the University of Houston.

First, we decided to cut down the number of documents that would be prepared and forwarded for central review by about two-thirds, by concentrating on program-level documents only.

Second, we implemented the controlled workload approach discussed earlier.

Third, we have placed major emphasis on developing statements of program goals and objectives with the idea that once these are known, the financial and statistical data needed for planning appear rather naturally and easily.

Fourth, the deans are being asked to develop quality ratings of the instructional activities by level of instruction. This is difficult to do and I suppose we will learn as much about our deans as we will about the quality of their programs. We hope to sharpen this aspect of the planning process next year.

Fifth, we have stretched out the planning cycle since we are in the second year of a biennial State appropriation where our funds for next year are reasonably well known in advance. We are planning now for budget impact in 1971-72. This gives us more time to zero in on goals, objectives, priorities and quality ratings and to work hard on the communication aspects of planning.

Finally, we have developed and published a comprehensive planning guide for use by all faculty and staff involved in planning.

HOW TRADITIONAL ACCOUNTING PROCEDURES COMPLIMENT PLANNING, PROGRAMMING AND BUDGETING SYSTEMS

by Donald Helland, Treasurer and Vice-President for
Business Affairs, Occidental College,
Los Angeles, California

I am delighted that, after hearing these presentations on program budgeting and methods of planning that I am able to bring us all down to the real world of debits and credits, purchase orders, and such. As an accountant reacting to these presentations, I would begin my presentation by quoting from a book by Harry Williams entitled "Planning for Effective Resource Allocation in Universities." "The president of the university can now see the estimated cost of meeting the teaching, research, and community services provided by that institution in terms of alternative postures as well as in terms of trying to relate to the program budgeting format." My guess is, we've not come this far; but I'm optimistic for the future of planning.

Sound financial accounting systems are a basic necessity to planning and program oriented analysis. I am familiar with a small school in the midwest which made a very fine effort to do advanced planning. However, when it later developed that the resources they had counted upon were not to be realized, the institution was forced into a very difficult financial position. Another public institution in the midwest attempting to undertake a very large program was supported by the district with a very sizeable amount of funds, yet after some time, was unable to furnish a sound financial accounting which would reflect back to the various constituents or publics of that institution just exactly what had been done with the money entrusted to it. I therefore underscore that along with the PPBS emphasis, we have a continuing need for sound financial accounting. It must be administered, not necessarily by people who are out of classical or traditional accounting, but who are representative of what accountants are able to bring to bear not only in industrial and commercial systems, but also in universities and colleges. I think the accounting profession today as exemplified by the American Institute of Certified Public Accountants, is probably a group considered to be in the classical, traditional camp. I think they do not represent the kind of accounting that needs to be brought to bear if accounting is to be an assist and service to PPBS Systems.

THREE ACCOUNTING SERVICES

The accountant is involved in three kinds of services to the institution and to the various publics outside of that institution to whom they must report. He is responsible for a score-keeping function, an attention-direction function, and a problem-solving function. It is my estimate that in terms of Sears and Roebuck's good, better, and best, we do "good" in problem-solving, "better" at attention direction, and "best" at score-keeping. Let me give you an example of the kinds of things which might fall into these three categories.

We are examining the program of food service in a college or university. In order to provide a score-keeping function, the accountant may arrive at a value for the total expenditures for food cost. This figure is not related to anything else but stands alone. This would be a score-keeping function. To describe the attention-directing service, you might provide an achievement figure, the total actual cost of food in relation to the budgeted amount. A problem-solving service might provide in addition to the total cost of food, alternate methods of providing the same function, make or buy kinds of decisions; perhaps a contract with a food service firm.

TRADITIONAL ROLES OF ACCOUNTING

The four traditional accounting roles to which I refer are fiduciary responsibility, fund accounting, financial statements, and future direction.

FIDUCIARY RESPONSIBILITY

Every college or university has a fiduciary responsibility to its various publics. It is entrusted with the assets provided for it by students, faculty, trustees, legislators, foundations and federal agencies to list the major ones. Each of these publics has an interest in the manner in which the university uses these funds. Each one of these publics is interested in seeing that the college or university puts these funds to the use for which they were intended. These interests do not always coincide. For example, there are funds made available for certain restricted programs which may require a college to give long-term support to a program for which it had no previous plans. Fiduciary responsibility is therefore primarily a responsibility of stewardship. A stewardship of receiving the funds, and storing them until they are eventually used, and using them according to the purpose for which they were designated.

In order to carry out the fiduciary responsibility it is necessary that an accounting system will include methods of control which will guard the use of the assets for the institution based upon sound business procedure. This includes internal and external audits to insure that the institution has exercised good stewardship in their use. Our fiduciary responsibility to our publics includes not only the stewardship function but also the function of sound planning. This is one interface between the classical accounting approach and PPBS. If we indicate to our publics, not only our students and faculty, but also those who otherwise support us, that not only have we spent their assets wisely, but we have also taken good care of the replenishment. By this activity we will not only gain their respect, but hopefully, their continuing support. I would say that our fiduciary responsibility to our various publics is an activity which is of increasing importance, particularly among private colleges, who will likely be more and more turning to public money. With this development we will open ourselves to a greater number of inspections then we presently have.

FUND ACCOUNTING

I know you are somewhat familiar with fund accounting but I wish to bring it to your attention so that you would recognize that in the planning process, some attention be given to the availability of funds, as well as to the various sources of the funds. We must know what kinds of funds are available in support of the annual budget and to know those which are available in the future for support of future activity. Funds are traditionally divided into unallocated and allocated categories. Unallocated, current funds, are funds which are available for the use of the institution upon the decision of its chief executive. These are funds which come to us from whatever source "without strings attached." Allocated, current funds on the other hand, are those funds which are allocated on the basis of a specific administrative decision to be used for specific purposes. Of course, anyone who establishes the basis of their allocation can also unallocate them and bring them back into the unallocated expenditure stream. An example of an allocated fund is an amount of $100,000 set aside for building maintenance and renewal. Restricted current funds are funds which are restricted to their use--restricted as to the programs which they may support. They are restricted by virtue of the donors or grantors required. The restriction on current funds is never by action of the administration of the university. It is always by action of the person who brings the fund into the university. The fund restriction may not be manipulated. One of the problems of restricted funds is in the area of gifts from foundations, from the federal government, and the whole underwriting of special kinds of projects which tend to come to the university for specific purposes such as maintaining a minority student program. One of the problems which restricted funds can create is that they introduce programs to the university which it may not wish to support over a long period of time. During the three years for which you do have funding, you develop an organization, you provide the facilities, you fund the staff and then you ultimately cannot get out of the program which you had not originally planned to enter. Endowment funds, plant funds and agency funds, are categories identifying specific kinds of restricted funds.

FINANCIAL STATEMENTS

Financial statements are reports to the various publics of the activities the institution carried out during a specified period of time. These include operating statements and statements of changes in fund balances. It is unfortunate that financial reporting has developed in colleges and universities along lines suitable for commercial enterprises. Colleges and universities have a need for quite different kinds of financial reporting.

The balance sheet is a statement at a point in time describing the financial position of the university. It indicates whether the funds of the university are covered by the necessary assets, whether or not these assets are available to support programs of the college and university. The balance sheet indicates the equity of the various funds.

The operating statement, unlike the balance sheet, reports on activities during a period of time. It is not a picture of a single date. There may be operating statements describing a small portion of the institution, or one for the total university operation. In relating revenue and expenditures, and the excess of revenue over expenditures or vice versa, the operating report indicates whether the funds of a particular program have increased or decreased over a period of time. This accounting reveals whether or not funds are available on an annual basis for a longer period of time such as that resulting from a five year plan. If a proposed operating budget describes needs of $50,000,000 and the current experience indicates that this amount is not being funded, then all of the good planning in the world will not change this fact.

FUTURE DIRECTIONS

One of the future directions in which accounting will move as a result of the interest in planning, programming, budgeting systems, is in this area of management information systems. Where we have perhaps previously thought that financial data was in a bank all of its own, and unrelated to all other kinds of quantative data, it is now being included in the total concept of quantifiable information. This entire system is composed of a number of sub-systems, one of which is accounting. So in the future it is expected that accounting will become a part of this total information system and there will be those responsible for its maintenance and extraction of data from it. It is possible that the persons who deal with information at that level will be those presently called operations research specialists. Other directions for the future will be the areas of accounting principles which relate to institutions of higher learning. You should recognize that for a number of reasons the accounting systems of colleges and universities are extremely conservative. For example, in the recording of securities given to an institution, they are priced at worth at market value at the time of the gift. Subsequent appreciation is not taken into consideration. It is highly possible that there will be a change in financial reporting so that we will no longer be concerned with profit and loss statements, and balance sheets. Rather we will be concerned about the balance of fund statements. How much goes in as a result of revenue, how much comes out of it as a result of expenditures, how much is left in the form of assets, assets readily convertible to cash and thus available for program support.

Another development will be in the firection of managerial accounting. There will be increased concern with such items as costs versus increased volume for the institution. Absolute cost, average cost and marginal cost approaches will become a part of the analysis procedure. There will be concern with fixed versus variable cost and each of these will become a part of the analysis procedure. There will be concern with fixed versus variable cost and each of these will become part of the management decision process. Finally, accounting as it is allied to PPBS will develop more skills in the area of attention directing. It is likely that accountants will do the monitoring, comparing actual with planned. It is not enough just to develop plans, it is also necessary to monitor these plans in a manner of commonly accepted accounting procedures and to produce various kinds of financial statements for management purposes. Hopefully the accountant will become more adept in the arena of higher education, particularly in his concern for problem solving. He is currently not heavily in that activity. He is not a decision-maker. He is not an allocator of funds. Rather he is one who is able to direct attention, to assist in problem solving, and to keep score. And, as planning proceeds along program lines, traditional accounting will adapt in response to this requirement for accounting data which crosses organizational lines. Fund account may not match program descriptions. Budgets assigned by organizational units may not coincide with program responsibilities.

CASE HISTORY: PROGRAM BUDGETING AT CALIFORNIA STATE COLLEGE AT LONG BEACH

by Robert B. Henderson

The State of California several years ago decided to switch to a program budget system, and the State Colleges, as well as all other units of the State, were directed to make this change. We are in our fourth year of working out a program budget process at Long Beach. While we do not yet have a finished product, I would like to describe our efforts in this direction.

A word or two about our institution will help to make the sequel more understandable. We reorganized three years ago into six Schools: Letters and Science, the largest, comprises about 60% of the students and includes twenty four departments in the humanities and in the social and natural sciences. The other five are essentially professional schools; Business, Education, Fine Arts, Engineering, and Applied Arts and Sciences. In effect, on our campus the term "School" means much the same as the term "College" means in most University organizations. Currently, we enroll about 27,000 students representing about 19,000 FTE. An item of history plays a part in this budget process description. In 1959, when a new president, Carl W. McIntosh came to Long Beach, a system of Budget Performance Units (BPU) was instituted. This meant that funds from the several line items in the College budget were allocated to the units and accounts were kept which showed expenditures by categories for each Budget Performance Unit. For example, departments each had a BPU number, each administrative office had a BPU number, etc. Salary, supplies, services, travel, equipment, funds were charges against these BPU numbers as expended. Hence, departments and other units have had some experience in managing funds in numerous individual accounts.

At the outset we made two basic decisions, (which might very well be inappropriate for another institution.) One was stated as: "academic planning must preceed fiscal planning." This decision is a reflection of a local historical fact. We have grown in 20 years from zero to 27,000 students and the growth has been chaotic and haphazard. About the effects of the rapid growth I can say two things, one good and one bad. The good thing is that the regular annual increase has made it relatively easy to fund new programs or courses. We were able to postpone the need to dig into existing support for something without having to look ahead seriously to the import of this new commitment in future years. On the other hand, the building program has always lagged behind the enrollment and this chronic situation has led to distortions. If a building was available, a department could grow; if only makeshift or inadequate facilities were available, a program suffered extraneous limitation. On our campus it was, and is, unacceptable to start with the assumption that "what is, is right" and to develop a budgetary system using the present College as a model. Therefore, we found it necessary to ask departments, first, what they believed they should be doing and, second, to assign costs to the several functions they feel are essential or desirable. We realized that this operation would produce requests beyond our resources.

Since the State Colleges are presently funded essentially on a dollars per student basis (although there are many specific formulas) any College must strike a balance between cheap programs and expensive programs, and a "mix" must be devised that can be funded with the dollars available. We have to place limits on enrollment in expensive departments and guard against the decline of cheap ones. Since we are close to our "topping-out" size this formidable task must be done very soon. The College must decide on funding for the six Schools first. The the Schools must tell the departments both how much resources can be provided and what obligations they must meet, and the departments would then decide how to allocate the poverty.

The second decision to preceed program budgeting is more questionable. In order to get on with the job, we found that we had to abandon the idea of a "precise measure" of "output" or "benefit." I seriously doubt that any non-trivial measure of output or benefit can be found for a college or university, although I am aware that all experts on program budgeting say this is an essential part of the idea. We presently believe that we are working on a "management tool" and that departments, the schools, and the college will be forced to make subjective value judgements without any precise measurable output for guidance. We expect only that these judgements will be made in the clear, cold light of present and future costs. In the light of present dogma on program budgeting this is heresy. I simply state that we, when confronted with the problem of stipulating measures of educational output, decided to tackle the budget process first.

We do have records of the number of majors and degrees granted in each field. We know the numbers of student-credit-hours taught in each department. And, of course, we inform the departments of these facts. We tell departments what obligations they have to students who are not majors in that department or for whom a given course is not a requirement, and so forth. And we require departments to staff and schedule sections sufficient to provide for that department's obligations. In this sense we have a measure of load or output, but we have no way of deciding whether we ought to alter these historic patterns of instructional load. But we have no quantified device as a part of this Program Budget which would allow us, for example, to say "We should reduce the number of Fine Arts majors and increase the output of nurses."

On our campus, we began three years ago, innocently, with a trial package, asking department chairmen and heads of the other budget units to write statements of their "mission" and to allocate budget requests among several kinds of functions or wants. Parenthetically, I add that my discussion will deal solely with the academic phase of our total program. The first year we learned what a multitude of terms can be used to describe a number of common activities and something about what the several academic departments thought they were up to. In retrospect it appears that we learned more about what not to do than what to do, but one thing we acquired was information which allowed us to set up a useful format.

The second year we arrived at a set of elements and tasks which adequately handled the kinds of things we are doing, or think we should do, with our academic program. I do not believe that the non-academic units made as much progress. A set of six Elements was defined which seemed to cover all our College functions, see Exhibit 1. A set of Components was given which handled the facets of the six Elements, and Tasks were set up under the Elements, see Exhibits 2 through 7. This framework was given to the departments and they were asked to estimate the funds they would need to do the things they were doing or thought they should be doing. As I have said - no limits were set up to this point on the total dollars involved or on the tasks set down by a budget unit. If a department thought it should work toward some extension of its activities, it proceeded to do so. Much information was given the departments as background; preprinted salary five-year projections, various State formulas for one kind of support or another, some history of various kinds of support for the department, etc. But a department was not limited by this information. It was free to project major departures or innovations. This year, the effort was viewed simply as practice with the format with an aim to perfecting it and to encourage a department to consider, evaluate, and plan its long-range desires.

The third year we had a bit of sorting out to do of a few sub-categories, but mostly the structure of the program remained unchanged. Departments were provided with preprinted forms with the previous year's data, plus five year projections. They were in effect asked two basic questions: "Is this a correct statement of the tasks you see for your department after a year's reflection?" and "Can you make the dollar approximations better?" Again no limits were placed on the dollar or position requests, but some increased definition was asked. For example, "operating expense" was broken down into categories (supplies,

CALIFORNIA STATE COLLEGE AT LONG BEACH

PROGRAM BUDGET BASIC FORMAT FALL, 1967		CHANCELLOR'S OFFICE FORMAT 1969-1970
LEVEL	ELEMENT	
CSCLB TOTAL PROGRAM	INSTRUCTION	INSTRUCTION
	INSTRUCTIONAL SERVICES	
	RESEARCH AND CREATIVE ACTIVITY	RESEARCH AND CREATIVE ACTIVITY
	COMMUNITY SERVICE	COMMUNITY SERVICES
	STUDENT SERVICES	STUDENT SERVICES
	GENERAL COLLEGE SERVICES	INSTITUTIONAL SERVICES

EXHIBIT 1

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY
CSCLB ACADEMIC SENATE - BUDGET COMMITTEE
FALL, 1967

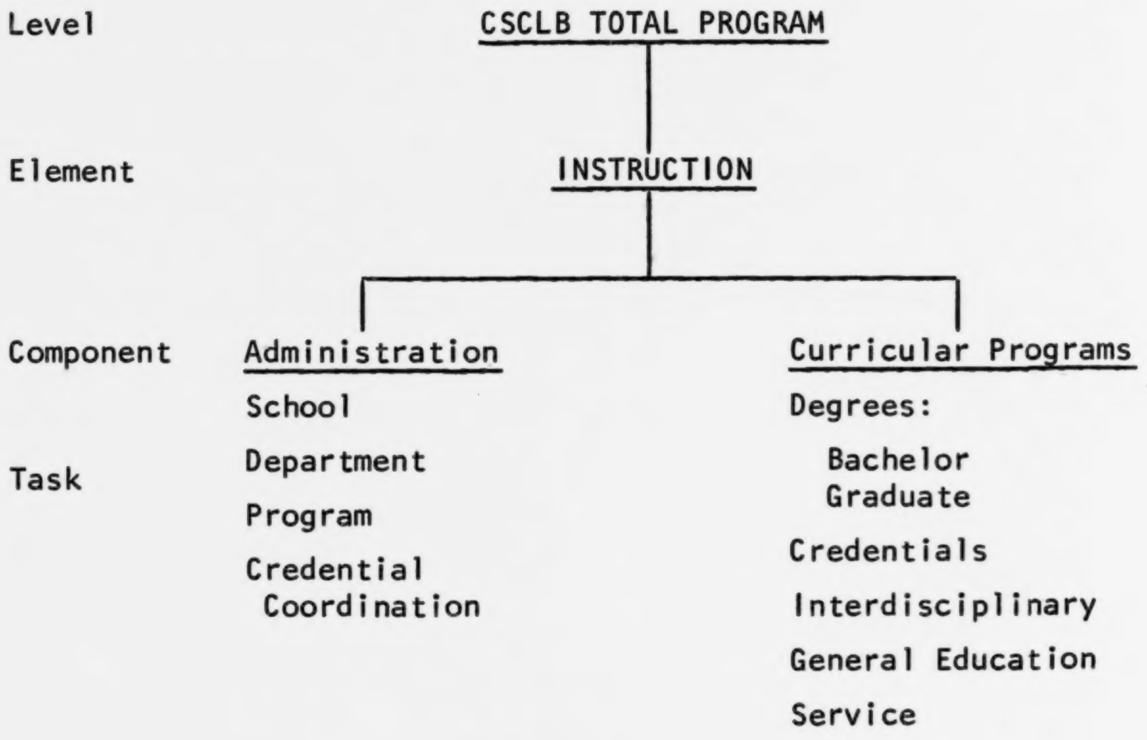


Exhibit 2

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY

CSCLB ACADEMIC SENATE - BUDGET COMMITTEE

FALL, 1967

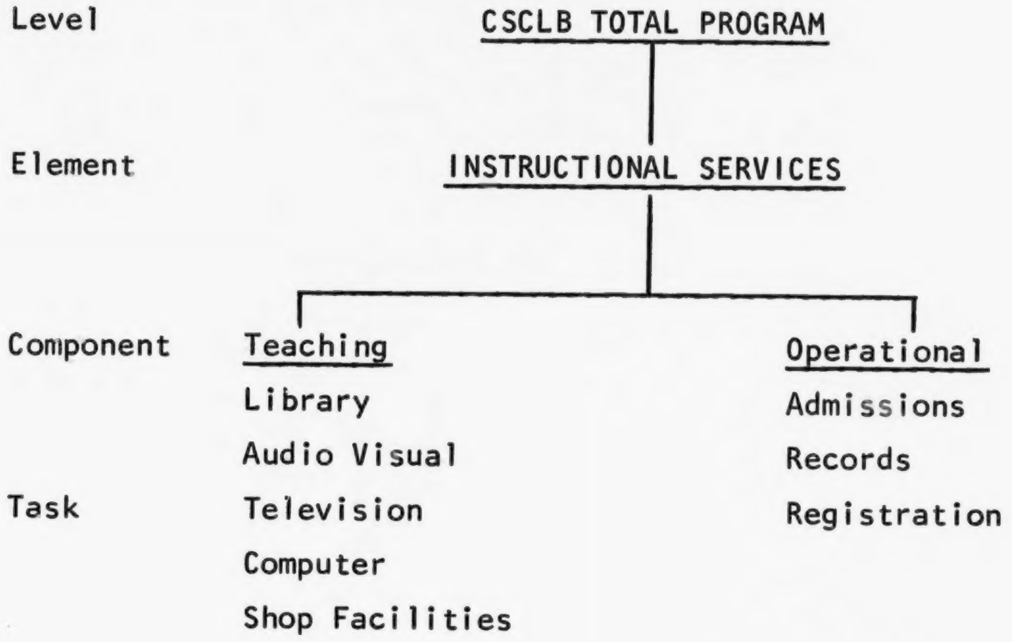


Exhibit 3

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY
CSCLB ACADEMIC SENATE - BUDGET COMMITTEE
FALL, 1967

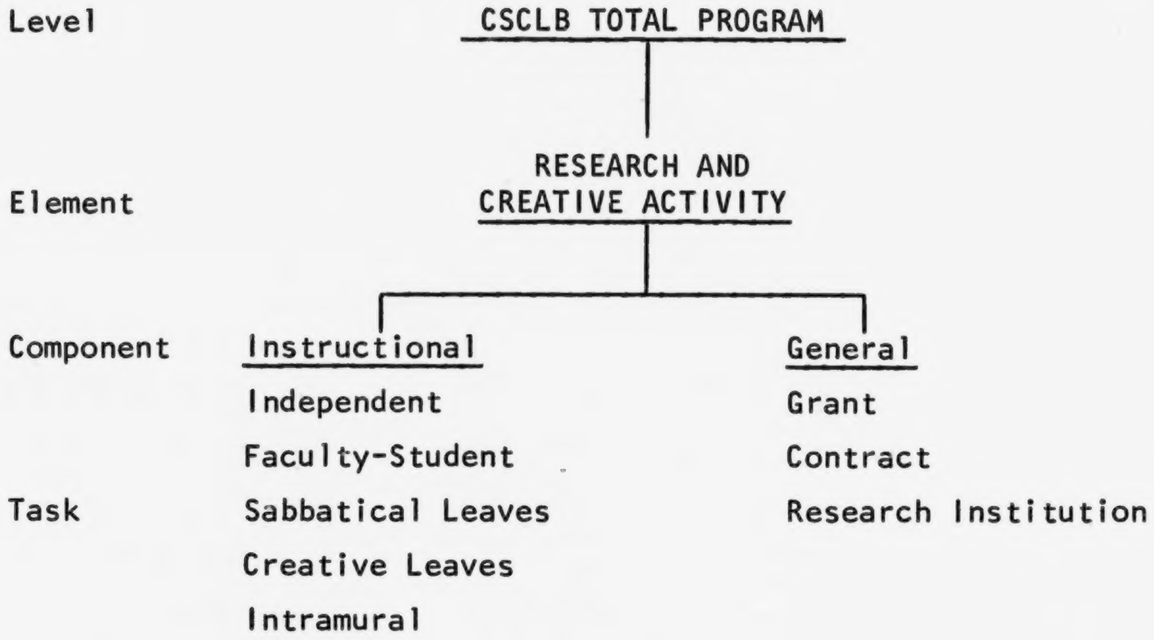
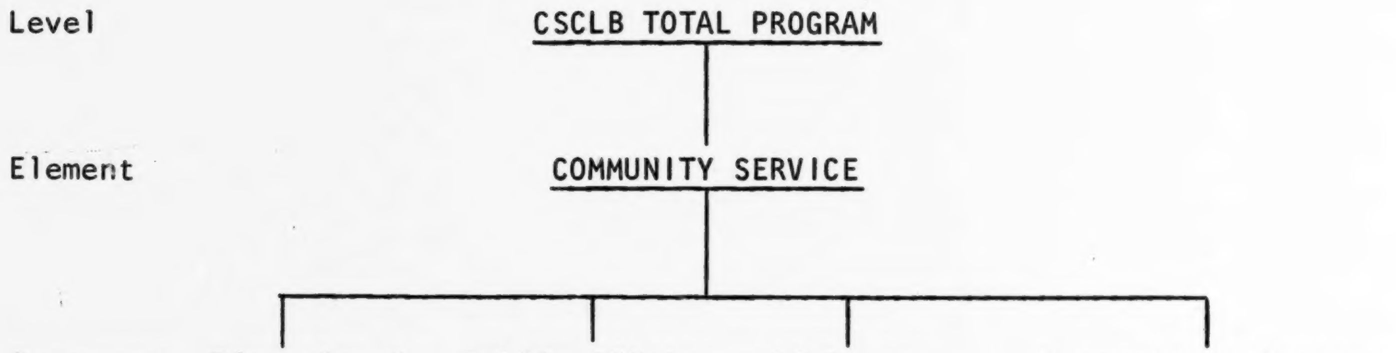


Exhibit 4

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY
CSCLB ACADEMIC SENATE - BUDGET COMMITTEE
FALL, 1967



Component	Educational	Public Affairs	Advisory	Community Relations
	Extension	Shows	Consultant	Public Information
	Continuation	Programs	Commissioned Research	Alumni
Task	Workshops	Lectures		Institutional
	Television	Galleries	Clinical	Government
		Publications		

Exhibit 5

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY
CSCLB ACADEMIC SENATE - BUDGET COMMITTEE
FALL, 1967

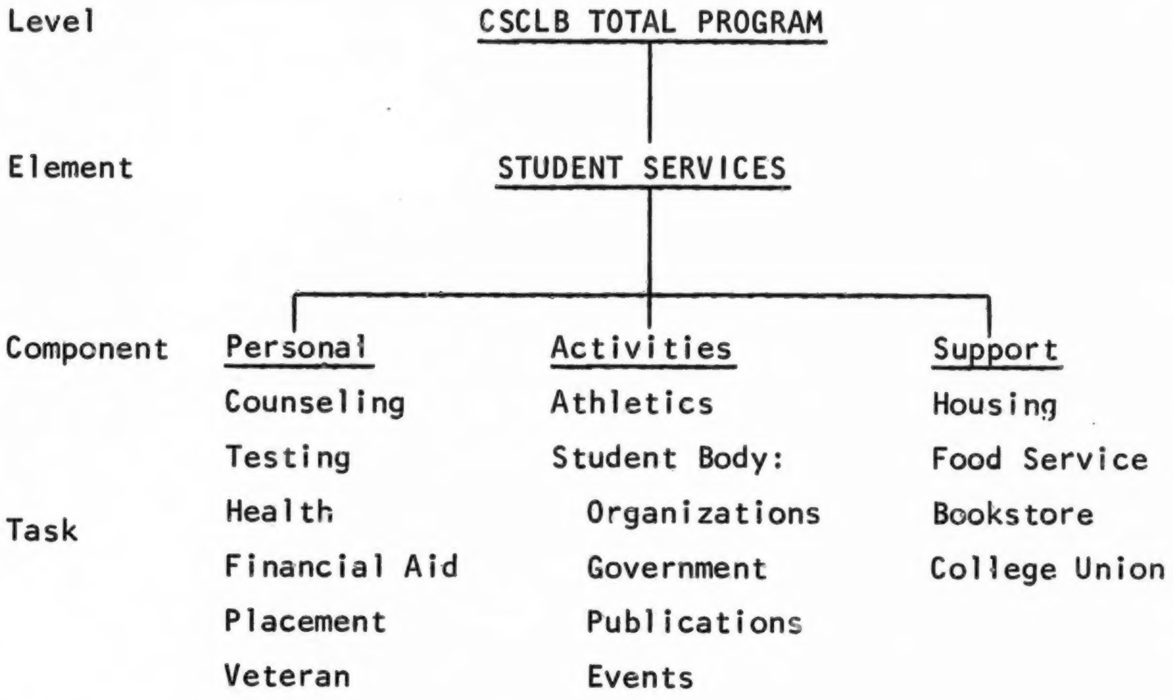


Exhibit 6

CSCLB 1969-70 BUDGET REQUEST
CONCEPTUAL FRAMEWORK FOR PROGRAM BUDGETING
AS RECOMMENDED BY
CSCLB ACADEMIC SENATE - BUDGET COMMITTEE
FALL, 1967

Level — CSCLB TOTAL PROGRAM

Element — GENERAL COLLEGE SERVICES

Component	Administration	Institutional
	Executive	Parking
	Business	Plant
	Budget	Security
Task	Audit	Communications
	Facilities	Duplicating
	Procurement	Foundation
	Payroll	Institutional Research
	Accounting	Data Processing
	Legal Service	

Exhibit 7

services, travel, rentals, books, films, communications, etc.) The departments were then asked to put the numbers together to show departmental totals in Instruction, Administration, etc. Admitting that the numbers might be very much beyond any that we could live with, at least we had a budget format that purported to show what a given task might cost. In principle - but not in fact - we could tell what a course or program would cost; and departments could see the fiscal impact of some particular departmental decision. Obviously, no decisions were actually based on this budget, because it was largely fictional.

This year, the fourth, we are taking one School (Applied Arts and Sciences) as a pilot unit and we are applying arbitrary boundary conditions in terms of dollar totals, number of positions, and teaching commitments, see Exhibit 8. Under these restraints imposed by our committee, the departments will decide how to allocate resources within the limits set. However, this is still part of the learning process and is intended to help us work out the remaining "bugs" in the forms and procedures before we apply this to the entire College.

To be more specific, this Spring our Committee is saying to the departments in the School of Applied Arts and Sciences "In previous years you have analyzed your operations and noted the things you think important and proper for you to do. We have given you information as to what your obligations are in Student-Credit-Hours in courses for teacher training, service, general education, departmental majors, etc. We will now tell you how many positions of faculty and staff employees and how many dollars in the various categories you can have. Now you plan how you can best

SCHOOL OF APPLIED ARTS AND SCIENCE
FALL, 1968 EXPENDITURE BASE
STUDENT ENROLLMENT ANALYSIS
FACULTY TIME - CURRICULAR PROGRAMS

DEPARTMENT	TOTAL	UNDERGRADUATE	GENERAL EDUCATION	GRADUATE	CREDENTIAL	SERVICE
UNITS						
052	5.00	2.00	.00	3.00	.00	.00
054	125.20	99.28	7.00	1.47	.17	3.82
055	108.76	8.02	49.67	.69	22.69	1.91
056	204.04	127.20	.00	10.89	9.61	10.37
057	355.22	125.49	16.56	38.75	95.55	36.46
058	111.56	109.96	.00	.00	.00	1.59
059	250.28	65.84	94.17	8.11	73.57	7.87
060	167.00	166.74	.00	.00	.26	.00
061	47.20	44.72	.00	.00	.00	.00
062	66.84	35.96	.27	12.48	2.54	1.94
063	195.08	58.97	53.13	17.69	35.99	.90
TOTALS	1,636.18	844.18	220.80	93.08	240.38	64.86
POSITIONS						
052	0.4	0.2	0.0	0.2	0.0	0.0
054	10.4	8.3	0.6	0.1	0.1	0.3
055	9.1	0.7	4.1	0.1	1.9	0.2
056	17.0	10.6	0.0	0.9	0.8	0.9
057	29.6	10.5	1.4	3.2	8.0	3.0
058	9.3	9.2	0.0	0.0	0.0	0.1
059	20.9	5.5	7.8	0.0	6.1	0.6
060	13.9	13.8	0.0	0.0	0.1	0.0
061	3.9	3.7	0.0	0.0	0.0	0.0
062	5.6	3.0	0.1	1.0	0.2	0.1
063	16.3	4.9	4.4	1.5	3.0	0.1
TOTALS	136.4	70.4	18.4	7.7	20.2	5.3

Exhibit 8

meet your basic obligations for the next five years within these parameters. If there are some things you can't afford, either cut back somewhere or ask for program augmentations in a specific sense."

For the purpose of this hypothetical Program Budget the Committee is using simply extensions forward for five years of the levels of support of the past five years. We refer to these as "straightline projections," see Exhibit 9. No value judgements are involved at this time as to whether or not one department or another should be given increased emphasis or support. This is an effort to make the program fit an arbitrary reality and to see what problems we encounter in the process.

We find ourselves tangled in details of cost accounting, coding for computer handling of information, what are the real constraints as opposed to apparent constraints, and a myriad of really trivial items. But we feel we must sort these out first before we can go into program budgeting for the entire College for realistic planning and management decision use.

PROGRAM BUDGET REQUEST TOTALS

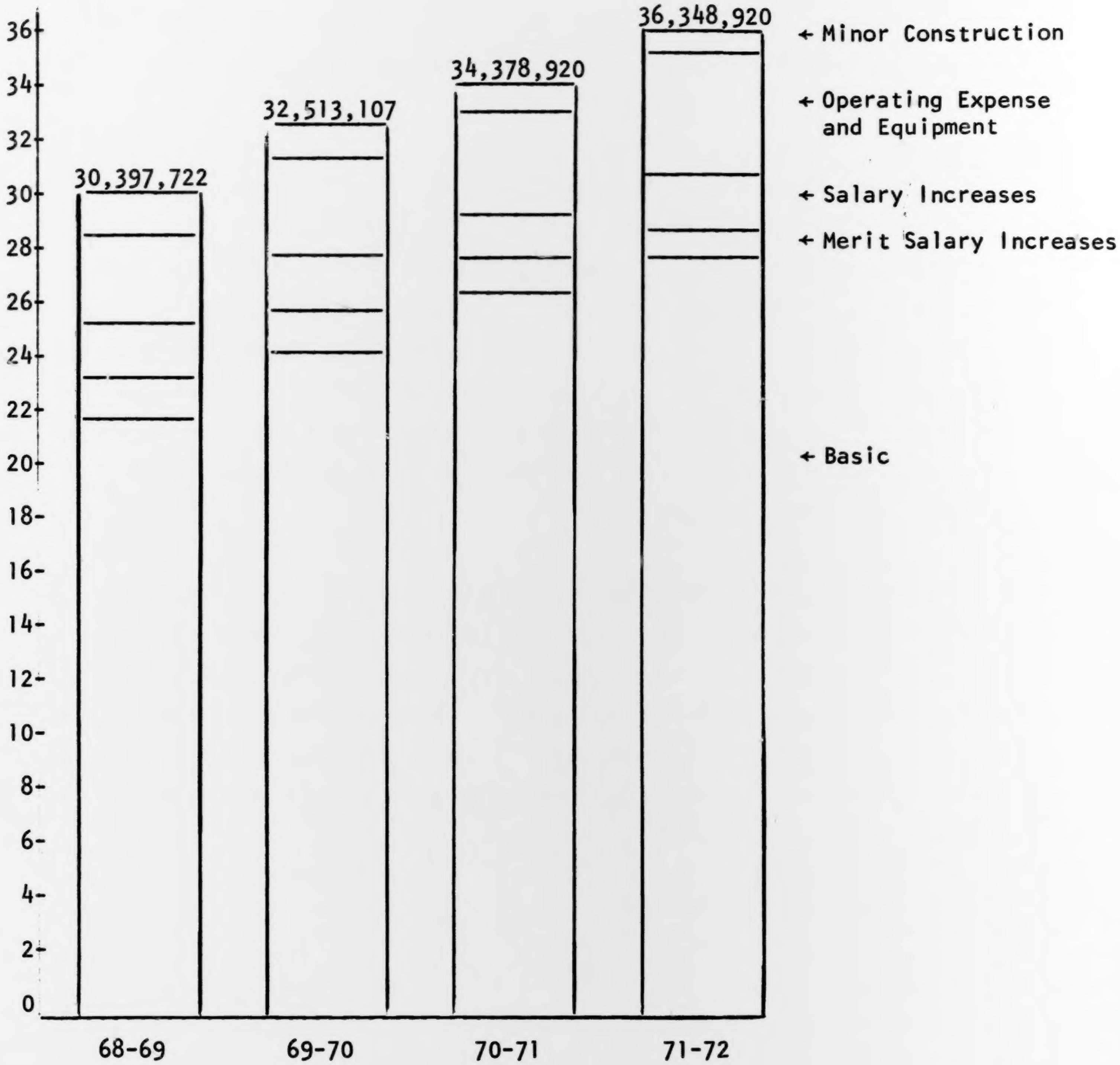


Exhibit 9